VK.COM/STOPTHEPRESS

HOW CIERVA'S AUTOGIROS HELPED WIN THE BATTLE OF BRITAIN

AVIATION HISTORY

CREATURE OF THE NIGHT

LOCKHEED'S NEARLY INVISIBLE TOP-SECRET F-117 STEALTH FIGHTER STRIKES SERBIA

PACIFIC P-47 ACE'S FATAL PURSUIT OF RICKENBACKER'S WWI RECORD

SHIP-LAUNCHED CAMELS DESTROY ZEPPELIN BASE

JULY 2016
HISTORYNET
HistoryNet.com

Spirit in the Sky

THE NEW **C8** FLYER AUTOMATIC
VINTAGE BLACK EDITION – 44MM

Inspired by the Best of British Aviation

EXCLUSIVELY AVAILABLE AT
christopherward.com

CHR.WARD
LONDON

CHR.WARD
LONDON
MARK I
AUTOMATIC
SWISS MADE

JULY 2016

NOW YOU SEE IT
A Lockheed F-117 Nighthawk from the 49th Fighter Wing flies over New Mexico.

DEPARTMENTS

5 MAILBAG

6 BRIEFING

12 EXTREMES
E.G. Budd's stainless steel cargo plane featured a retractable tail ramp.
By Robert Guttman

14 AVIATORS
"Matty" Laird designed and built custom air racers during aviation's golden age.
By Edward H. Phillips

16 RESTORED
Quantico's SBD Dauntless spent nearly half a century underwater.
By Mark Carlson

19 LETTER FROM AVIATION HISTORY

58 REVIEWS

63 FLIGHT TEST

64 AERO ARTIFACT

FEATURES

20 THE BLACK JET
The first U.S. warplane to feature top-secret stealth technology, Lockheed's F-117 gained a reputation as the world's most invisible aircraft. *By Charles W. Sasser*

28 PACIFIC THUNDERBOLT ACE
P-47 proponent Colonel Neel Kearby pushed his luck too far in pursuit of Eddie Rickenbacker's shootdown record.
By John Stanaway

36 NIGHT OWL
Heinkel's radar-laden He-219 Uhu night fighter was designed from the ground up to play in the dark. *By Stephan Wilkinson*

44 THE TONDERN RAID
On July 19, 1918, seven Sopwith Camels struggled aloft from an improvised aircraft carrier to bomb German zeppelin sheds in Denmark. *By Don Hollway*

52 AUTOGIROS AT WAR
RAF Rota pilots played a vital yet unheralded role in the Battle of Britain. *By Bruce H. Charnov*

ON THE COVER: *Two Lockheed F-117 Nighthawks line up for aerial refueling during a training mission out of Holloman Air Force Base in New Mexico. The stealthy "Black Jets" bombed enemy targets with impunity in the 1991 Gulf War and in 1999 during the Kosovo conflict (story, P. 20). Cover: Lance Cheung/Legion Photo.*

CLOCKWISE FROM TOP LEFT: ©JOHN M. DIBBS/THE PLANE PICTURE CO.; SAN DIEGO AIR & SPACE MUSEUM; NATIONAL MUSEUM OF THE U.S. AIR FORCE; COURTESY OF WOLFGANG MUEHLBAUER

Advertisement

Upper Class Just Got Lower Priced

Finally, luxury built for value—not for false status

Only a few of us are born with silver spoons in our mouths. Until Stauer came along, you needed an inheritance to buy a timepiece with class and refinement. Not any more. The Stauer ***Magnificat II*** brings the impeccable quality and engineering once found only in the watch collections of the idle rich. If you have actually earned your living through intelligence, hard work, and perseverance, you will now be rewarded with a timepiece of understated class that will always be a symbol of refined taste. The striking case, finished in luxurious gold, compliments an etched ivory-colored dial exquisitely. By using advanced computer design and robotics, we have been able to drastically reduce the price on this precision movement.

Do you have enough confidence to pay less? Status seekers are willing to overpay just to wear a designer name. Not the Stauer client. The ***Magnificat II*** is built for people who have their own good taste and understand the value of their dollar—finally, luxury built for confident people. And this doesn't mean the rich aren't smart. Quite the contrary, Stauer's clients include a famous morning news host, the infamous captain of a certain starship, a best actor nominee, a best actor winner and the number one rock guitarist of all time. They were all clever enough to recognize a spectacular value.

It took three years of development and $26 million in advanced Swiss-built watch-making machinery to create the *Magnificat II*. Look at the interior dials and azure-colored hands. Turn the watch over and examine the 27-jeweled automatic movement through the exhibition back. When we took the watch to George Thomas (the most renowned watchmaker and watch historian in America), he disassembled the ***Magnificat II*** and studied the escapement, balance wheel and the rotor. He remarked on the detailed guilloche face, gilt winding crown, and the crocodile-embossed leather band. He was intrigued by the three interior dials for day, date, and 24-hour moon phases. He estimated that this fine timepiece would cost over $2,500. We all smiled and told him that the Stauer price was less than $90. He was stunned. We felt like we had accomplished our task. A truly magnificent watch at a truly magnificent price!

Try the ***Magnificat II*** for 60 days and if you are not receiving compliments, please return the watch for a full refund of the purchase price. The precision-built movement carries a 2 year warranty against defect. If you trust your own good taste, the ***Magnificat II*** is built for you.

TAKE 78% OFF INSTANTLY!
When you use your INSIDER OFFER CODE

Stauer Magnificat II Timepiece— ~~$399~~*

Offer Code Price **$\$87^{50}$** + S&P **SAVE $\$311^{50}$!**

You must use the insider offer code to get our special price.

1-800-333-2045

Your Offer Code: MAG502-07
Please use this code when you order to receive your discount.

Stauer®
14101 Southcross Drive W.,
Dept. MAG502-07
Burnsville, Minnesota 55337
www.stauer.com

ACCREDITED BUSINESS
Rating of A+

** Discount for customers who use the offer code versus the original Stauer.com price.*

Smart Luxuries—Surprising Prices™

Luxurious gold-finished case with exposition back - 27-jeweled automatic movement - Croc-embossed band fits wrists 6¾"–8½" - Water-resistant to 3 ATM

AVIATION HISTORY ONLINE

You'll find much more from *Aviation History* on the Web's leading history resource: HistoryNet.com

TWO-WAR AMERICAN ACE

P-47 pilot Gabby Gabreski (above) became the top ace in the European theater, then went on to shoot down MiGs over Korea.

RUTLAND OF JUTLAND

Frederick Rutland earned the DSC for a daring recon mission in a Short 184 seaplane during the 1916 Battle of Jutland.

FAIREY ROTODYNE

An ingenious blend of airplane and helicopter, the Rotodyne was an attempt to revolutionize the short-haul airline industry.

ONLINE/DIGITAL BONUS

Follow our step-by-step instructions to build this issue's "Modeling" project, a Lockheed F-117 Nighthawk, featured in "The Black Jet" (P. 20).

Let's Connect
Like *Aviation History* Magazine on Facebook

Digital Subscription
Aviation History is available on iPad and other digital platforms

HISTORYNET

MICHAEL A. REINSTEIN CHAIRMAN & PUBLISHER
DAVID STEINHAFEL ASSOCIATE PUBLISHER

AVIATION HISTORY

JULY 2016 / VOL. 26, NO. 6

CARL VON WODTKE EDITOR
NAN SIEGEL ASSOCIATE EDITOR
DIT RUTLAND ART DIRECTOR
JON GUTTMAN RESEARCH DIRECTOR
GUY ACETO PHOTO EDITOR

CONTRIBUTING EDITORS
WALTER J. BOYNE, STEPHAN WILKINSON

ARTHUR H. SANFELICI EDITOR EMERITUS

CORPORATE
STEPHEN KAMIFUJI CREATIVE DIRECTOR
ROB WILKINS DIRECTOR OF PARTNERSHIP MARKETING
MICHAEL ZATULOV FINANCE

DIGITAL
MICHAEL CLIFFORD DIRECTOR OF TECHNOLOGY
JOSH SCIORTINO ASSOCIATE EDITOR

ADVERTISING
COURTNEY FORTUNE Senior Graphic Designer/Advertising Services
cfortune@historynet.com

RICHARD E. VINCENT National Sales Manager
RVincent@historynet.com

KIM GODDARD National Sales Manager
KGoddard@historynet.com

RICK GOWER GA., S.C., N.C., MICH., OHIO **rick@rickgower.com**

TERRY JENKINS TENN., KY., MISS., ALA., FLA., MASS.
TJenkins@historynet.com

PRINT DIRECT RESPONSE ADVERTISING
RUSSELL JOHNS ASSOCIATES 800-649-9800
AVH@russelljohns.com

© 2016 HISTORYNET, LLC

PRINT SUBSCRIPTION INFORMATION AND BACK ISSUES
SUBSCRIPTION INFORMATION: 800-435-0715
YEARLY SUBSCRIPTIONS IN U.S.: $39.95
BACK ISSUES: 800-358-6327

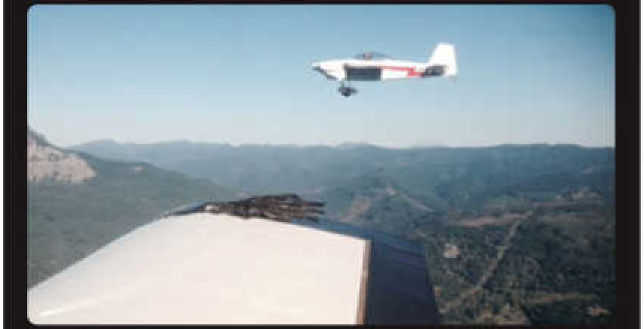
Aviation History (ISSN 1076-8858) is published bimonthly by HistoryNet, LLC
1600 Tysons Blvd., Suite 1140, Tysons, VA 22102-4883, 703-771-9400
Periodical postage paid at Leesburg, VA and additional mailing offices.
POSTMASTER, send address changes to Aviation History, P.O. Box 422224, Palm Coast, FL 32142-2224
List Rental Inquiries: Belkys Reyes, Lake Group Media, Inc. 914-925-2406; belkys.reyes@lakegroupmedia.com
Canada Publications Mail Agreement No. 41342519, Canadian GST No. 821371408RT0001

The contents of this magazine may not be reproduced in whole or in part
without the written consent of HistoryNet, LLC

PROUDLY MADE IN THE USA

U.S. AIR FORCE

BIRD STRIKE STORIES



Your May issue invited readers to submit bird encounter stories. As a private pilot for 48 years, I have flown a variety of aircraft; my current plane is an experimental Van's RV-4. I have had some close calls, but no bird strikes until last September when I was flying alongside my friend Jim, also in an RV-4, and I collided with what I assumed was a goose. >

> We were cruising at about 2,000 feet, flying into the sun about seven miles west of the Hood River, when I saw the flock. By the time I yelled "birds!" to my rear-seat passenger, Scot, the impact had occurred on the outer panel of the right wing. The plane jerked to the right, then quickly returned to normal flight. I called Jim to say I might have an emergency. The plane exhibited no unusual wing heaviness or skidding. Jim reported I had wing skin damage, and I could see the bird's wing lodged between the fiberglass tip and the metal wing skin [photo above].

Heading back to Kelso, Wash., I had a choice of airports if I needed to land beforehand. I flew progressively slower at altitude, to be sure I would have control for landing. The plane still behaved normally. Once on the ground, I could see that the bird's right wing spanned 2 feet, but the rest of the carcass had apparently gone into the Columbia River. I was impressed by the severity of the damage.

Jerry Sorrell
Castle Rock, Wash.

Way back in 1982 I was working as an A&P mechanic at the Beechcraft dealer in Van Nuys, Calif., when a B60 Duke that had suffered a bird strike came into our hangar. A duck had hit the aircraft at the top horizontal edge of the copilot's windshield. Half of the duck stayed outside the plane, and the other half came through the windshield and hit the copilot in the head, knocking him out. Then the half-a-duck proceeded to the back of the cabin. When the pilot looked over at his unresponsive copilot he saw that he was covered in blood (most of which came from the duck), and thought he was dead. The pilot landed the plane, the copilot went to the hospital and somebody—luckily not me—got to clean up the mess and repair the plane.

Ray Charlton
Corvallis, Ore.

Flying Hiller OH-23Cs for the Army in and around the Panama Canal Zone in the late 1950s inevitably involved encounters with frigate birds, which had wingspans up to 7½ feet. Like us, they preferred the lower altitudes. They rode updrafts over the beach and hovered, looking for fish.

Coming up behind one, your worst move was to turn out of its way. They seemed to have backward-looking radar that sensed your proximity. You never could guess which way they would bank to evade. If you and the bird turned in the same direction, a strike was almost certain. I had plenty of near misses.

I finally figured out the best tactic: Fly straight at them. That took nerves of steel. It didn't matter which way they broke; you just kept going straight. They'd get out of your way. I must admit to secretly hoping that one would wait a little too long to evade. I didn't have a death wish, but it would have been great to paint a bird silhouette beside the cabin door.

Well, frigate…that never happened. And it would have been awfully hard to explain to the CO.

John Ottley Jr.
Alpharetta, Ga.

Soon after WWII, my late husband, Rick Ravitts, was flying as a copilot on TWA DC-3s out of Kansas City to Albuquerque. On the approach to the mountains a big buzzard crashed through his side of the windshield, then bounced off some radio equipment and lay inert. Rick shielded himself from the onrushing wind while the captain brought the plane in for the landing. That brought the buzzard back to life and, right before the startled passengers, the tough old bird staggered down the aisle, vomiting all the way, then calmly walked out the door of the fuselage and flew away! Buzzard 1, TWA 0.

Gail Ravitts
Oak Park, Ill.

COCKPIT CONFUSION

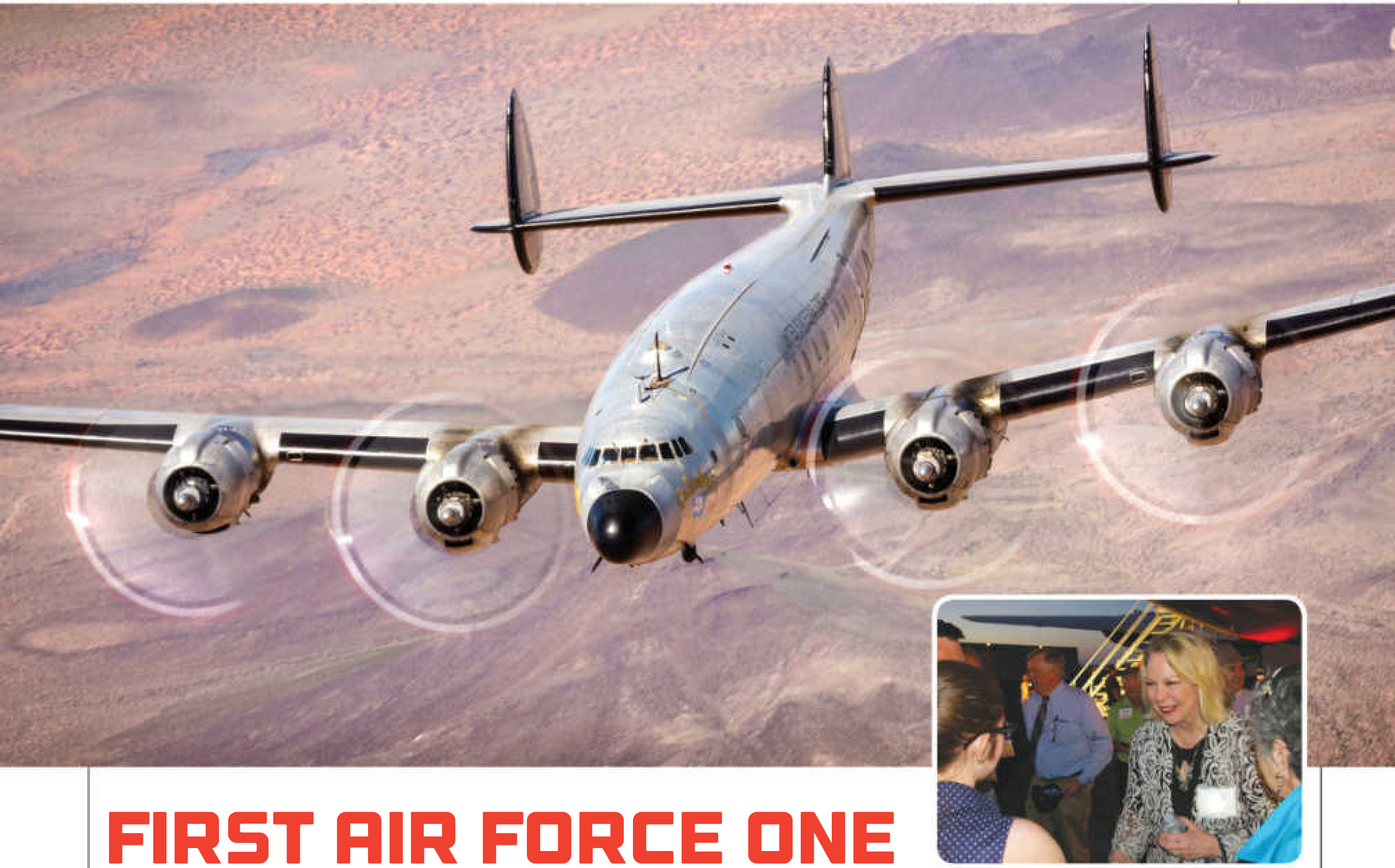
Your story "Going Commando" in the May edition was great, but the aide you sent out to the airplane to identify the cockpit bells and whistles let you down. Just looking at the pilot's flight instruments makes you wonder how you could fly this big machine with references to just airspeed, attitude, heading and fuel gauges. Wait, over on the copilot's side there is an altimeter, but what about a vertical speed indicator and the reliable old turn and bank instrument? And doesn't the pilot get his own altimeter?

William L. Shields
Tucson, Ariz.

Thanks for asking—we're embarrassed to have mislabeled a few key instruments. On the pilot's side, the instruments labeled no. 14 are (from left) vertical speed indicator, turn and bank indicator, and altimeter. To the right of the altimeter is the glide slope indicator. On the copilot's side, the same instruments are (from left) glide slope indicator, altimeter, turn and bank indicator, and vertical speed indicator (no. 15). The fuel gauges are on the pilot's side at the bottom of the instrument panel, partially obscured by the control wheel.

SEND LETTERS TO
***Aviation History* Editor, HistoryNet**
1600 Tysons Boulevard, Suite 1140, Tysons, VA
22102-4883 703-771-9400
OR EMAIL TO aviationhistory@historynet.com

BRIEFING



FIRST AIR FORCE ONE

CELEBRATED CONNIE *Columbine II* (above) heads to Virginia for restoration. Dwight D. Eisenhower's granddaughter, Mary Jean Eisenhower (inset), attended the sendoff in Arizona.

Following a gala sendoff celebration at Marana Regional Airport in Arizona on March 18, President Dwight D. Eisenhower's presidential aircraft, *Columbine II*, winged its way to a new home on the East Coast and a complete restoration. The new owners of the Lockheed VC-121, Dynamic Aviation of Bridgewater, Va., acquired the first aircraft to be designated Air Force One more than a year ago. Chairman of Dynamic Aviation Karl Stoltzfus said plans call for the airplane to undergo a "complete restoration to the period when the president flew in it. This aircraft is aviation history." An important part of the restoration will include the installation of the original galley that was found in Casper, Wyo., when word spread of Dynamic's acquisition of *Columbine II*.

Michael Stoltzfus, Dynamic's president, told the crowd of well-wishers that it is important to remember what this aircraft means. "This is the plane that took the president to the peace talks in Korea," he said. "This aircraft had on board Queen Elizabeth and the Shah of Iran."

Also on hand at the sendoff was President Eisenhower's granddaughter, Mary Jean Eisenhower, who recalled flying with her grandfather and talking with crew members and Secret Service agents. Walking through the partially restored cabin, Eisenhower said: "This is like a time warp. I'm so very happy that it is going to be restored."

After Dynamic Aviation bought the aircraft, they sent a team of mechanics to Arizona to begin repairs and prepare it for the trip east. It

has taken more than a year to ready *Columbine II* for its first flight after it spent a decade in the Arizona desert.

Officially known to the Air Force as 48-610, the L-749 Constellation was initially operated by the Military Air Transport Service, Atlantic Division. In 1952 it was pulled from service and flown to Lockheed's Burbank, Calif., plant, where it was converted to a VC-121A. The interior was fitted out with deluxe seating, a presidential desk, a galley and other amenities. The president had "Columbine" painted on the nose, a reference to his wife's home state of Colorado.

In 1959 Ike traded in *Columbine II* for *Columbine III*, a VC-121E Super Constellation. The original Air Force One was retired in 1968 and sent to storage at Davis-Monthan Air Force Base, in Arizona. In 1970 it was part of a four-aircraft auction sale to an investor group that bought them for spraying purposes. At the time it was not known that 48-610 was the first Air Force One, a fact only brought to light when Smithsonian officials informed the owners of the aircraft's pedigree.

In 1989, after some restoration, *Columbine II* went on the airshow circuit. In 1998 the aircraft was put up for auction but never sold. It was transferred in 2005 to Marana, northwest of Tucson, where Dynamic Aviation purchased it.

Dick Smith

ABOVE: ©TYSON RININGER/TVR PHOTOGRAPHY; INSET: DICK SMITH;
TOP RIGHT: SUZANNE HAKUBA; BOTTOM RIGHT: AIR FORCE ASSOC.

"WINKLE"
Eric Brown flew 487 different aircraft types.

WORLD'S GREATEST TEST PILOT

Superlatives are impossible to avoid when reviewing the astonishing flying career of Captain Eric "Winkle" Brown, Royal Navy, who died on February 21 at age 97. Arguably the greatest test pilot ever, Brown flew 487 different types of aircraft, including 55 captured German airplanes, and made 2,407 deck landings at sea. He was the first pilot to land a pure jet on an aircraft carrier. First to land a tricycle undercarriage aircraft on a carrier. First to land a high-performance twin on a carrier. The list goes on, perhaps topped by his being the only Allied pilot to fly the "suicidal" Messerschmitt Me-163B interceptor under rocket power.

Born in Edinburgh, Scotland, Brown gained his RAF wings with a rare "exceptional" rating before transferring to the Royal Navy's Fleet Air Arm, flying Grumman Martlets (F4F Wildcats) in carrier operations against Focke Wulf Fw-200 Condors. After his carrier was torpedoed, Brown was one of only two aircrew survivors.

Between 1944 and 1950, Brown was successively chief naval test pilot at the Royal Aircraft Establishment at Farnborough, commanding officer of the Enemy Aircraft Flight and commanding officer of Aerodynamics Flight. Various sea- and land-based appointments followed before he retired from the navy in 1970. In retirement Brown became chief executive of the British Helicopter Advisory Board. Later he enjoyed a third career as a lecturer and author.

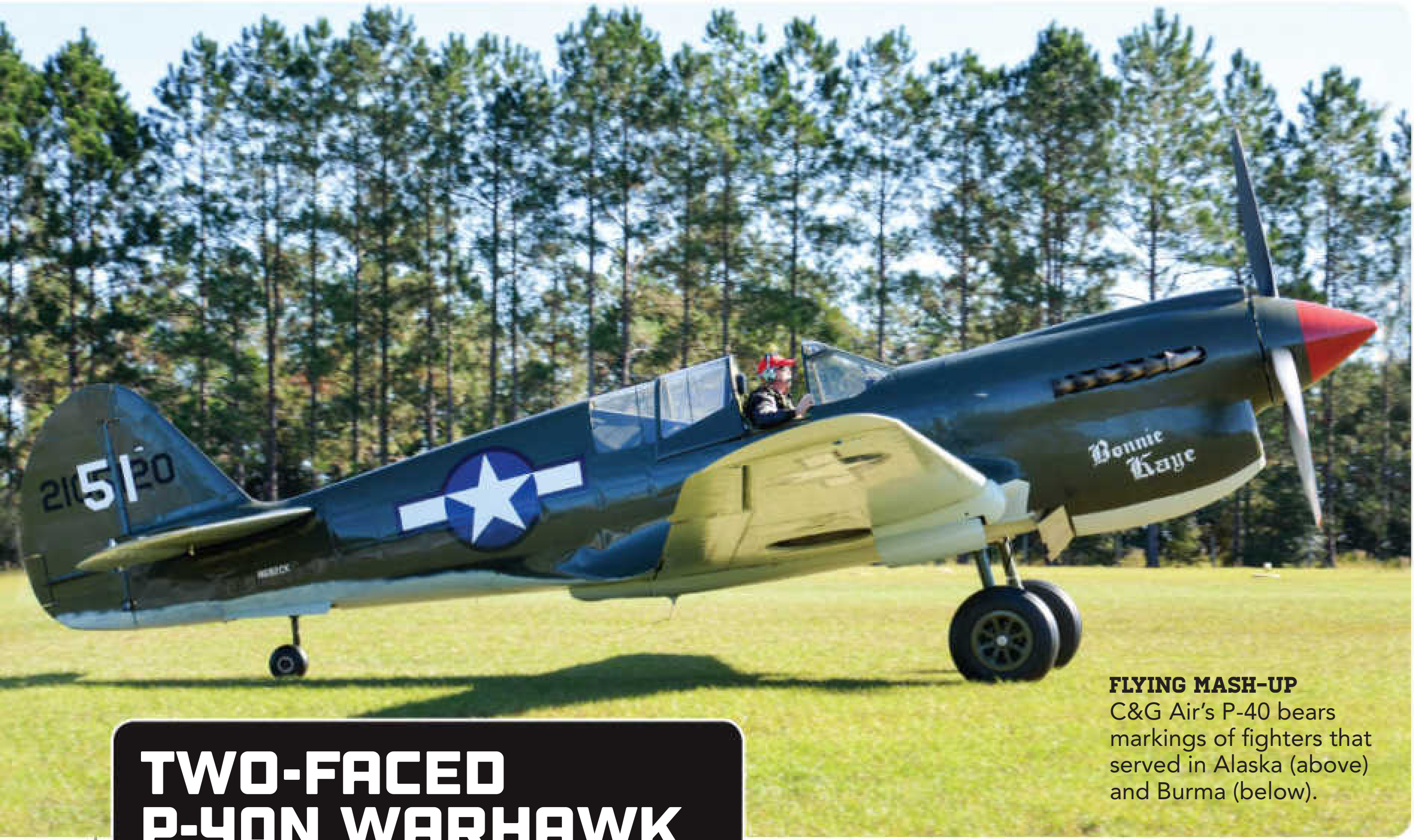
When I interviewed this disarmingly modest airman for *Aviation History* in 2008, I asked how he had survived when so many other test pilots had not. Brown attributed his continued existence to his relatively short stature (hence the nickname Winkle, short for periwinkle), which he believed had saved him from death or serious injury in situations where taller pilots, unable to extricate themselves from the cockpit, might have perished. That and meticulous flight planning—plus "a bit of luck."

Derek O'Connor

AIR QUOTES

"I HOPE THIS STEALTH S--T WORKS."

–MAJOR GREG FEEST, BEFORE LEADING THE FIRST F-117 STRIKE OF OPERATION DESERT STORM



FLYING MASH-UP C&G Air's P-40 bears markings of fighters that served in Alaska (above) and Burma (below).

TWO-FACED P-40N WARHAWK

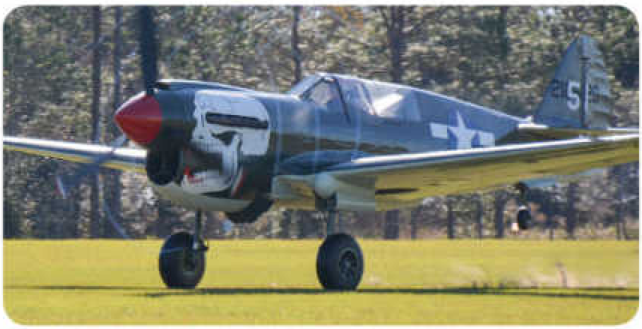
The Curtiss P-40 always punched above its weight. Except for the biplane-derived Grumman F4F, it was America's oldest front-line World War II fighter, yet it remained in production—and combat—well after far more sophisticated Mustangs, Corsairs and Thunderbolts had joined the fray. Only P-47s and P-51s were built in greater quantities than P-40s, a thousand of which were ordered as late as the end of June 1944, almost a month > > *after* the Normandy invasion. Its 1930s greenhouse, awkward landing gear and mediocre Allison engine remained pretty much unchanged. P-40s were manufactured by the least-respected of all the major airframers, the East Coast Curtiss-Wright, with whom the War Department would have preferred not to do business after a series of below-par designs and a spate of defective Wright engines.

Those of us who were kids during WWII knew nothing of this. The airplane of choice sketched in our schoolbook margins was not the P-38 (too difficult) or the P-47 (too boring) but the toothy P-40, uniquely famed for its brief service with the American Volunteer Group "Flying Tigers." No other warplane had so sharply drawn a personality.

The last and at 378 mph the fastest of the line was the P-40N, lightened and with a revised canopy for a cleaner rearward view. The N also had the longer fuselage and better handling of its K and L predecessors. Eight P-40Ns are now flying in the U.S., with the addition in January of *Bonnie Kaye*, an impressive rebuild by C&G Air of Ocala, Fla. The project was undertaken as an investment by C&G co-owners Chris and Gail Kirchner, and the airplane is already for sale. It was erected around some forgings from a wreck salvaged in Alaska in the early 1990s, and is a flying mash-up of P-40 history. The right side of the restoration bears the name Bonnie Kaye, given to his airplane by Captain Ernest Hickox before he died in a crash in Alaska days before the end of the war, and the left cowling panels carry the death's head logo of the 80th Fighter Group "Burma Banshees," which operated in the China-Burma-India Theater between 1942 and 1945.

That's two airplanes for the price of one, which at going rates will probably be about $1.25 million.

Stephan Wilkinson



PHOTOS: MATT ABRAMS

Actual size is 40.6 mm

Millions Demand America's Purest Silver Dollar. Shouldn't You?

Secure Your New 2016 Eagle Silver Dollars Now!

Millions of people collect the American Eagle Silver Dollar. In fact it's been the country's most popular Silver Dollar for thirty years. Try as they might, that makes it a very hard "secret" to keep quiet. And right now, many of those same people are lining up to secure the brand new 2016 U.S. Eagle Silver Dollars —placing their orders now to ensure that they get America's newest Silver Dollar, in stunning Brilliant Uncirculated condition, before millions of others beat you to it.

America's Brand New Silver Dollar

This is a strictly limited release on the 30th anniversary of one of the most beautiful silver coins in the world. Today you have the opportunity to secure these massive, hefty one full Troy ounce U.S. Silver Dollars in Brilliant Uncirculated (BU) condition. The 100-year-old design features a walking Lady Liberty draped in a U.S. flag on one side and a majestic U.S. Eagle and shield on the other.

But the clock is ticking...

The Most Affordable Precious Metal— GOVERNMENT GUARANTEED

Silver is by far the most affordable of all precious metals — and each full Troy ounce American Eagle Silver Dollar is government-guaranteed for its 99.9% purity, authenticity, and legal tender status.

A Coin Flip You Can't Afford to Lose

Why are we releasing the most popular Silver Dollar in America for a remarkably affordable price? We're doing it to introduce you to what hundreds of thousands of smart collectors and satisfied customers have known since 1984—GovMint.com is *the best source for coins worldwide*.

Timing is Everything

Our advice? Keep this to yourself. The more people who know about this offer, the worse for you. Demand for Silver Eagles in recent years has shattered records. Experts predict that the 30th anniversary 2016 Silver Eagles may break them once again.

30-Day Money-Back Guarantee

You must be 100% satisfied with your 2016 American Eagle Silver Dollars or return them within 30 days of receipt for a prompt refund (*less s/h*). Don't miss out on this exciting new release. Call immediately to secure these American Eagle Silver Dollars NOW!

2016 American Eagle Silver Dollar BU

Shocking Low Price $16.95 ea. *(plus s/h)*
LIMIT 10.
Additional 2016 Silver Eagle BU Dollars may be purchased for $17.95 each. Limited to 50 total coins per household.

FREE SHIPPING on 9 or More!

Limited time only. Product total over $150 before taxes (if any). Standard domestic shipping only. Not valid on previous purchases.

For fastest service, call today toll-free

1-800-969-0686

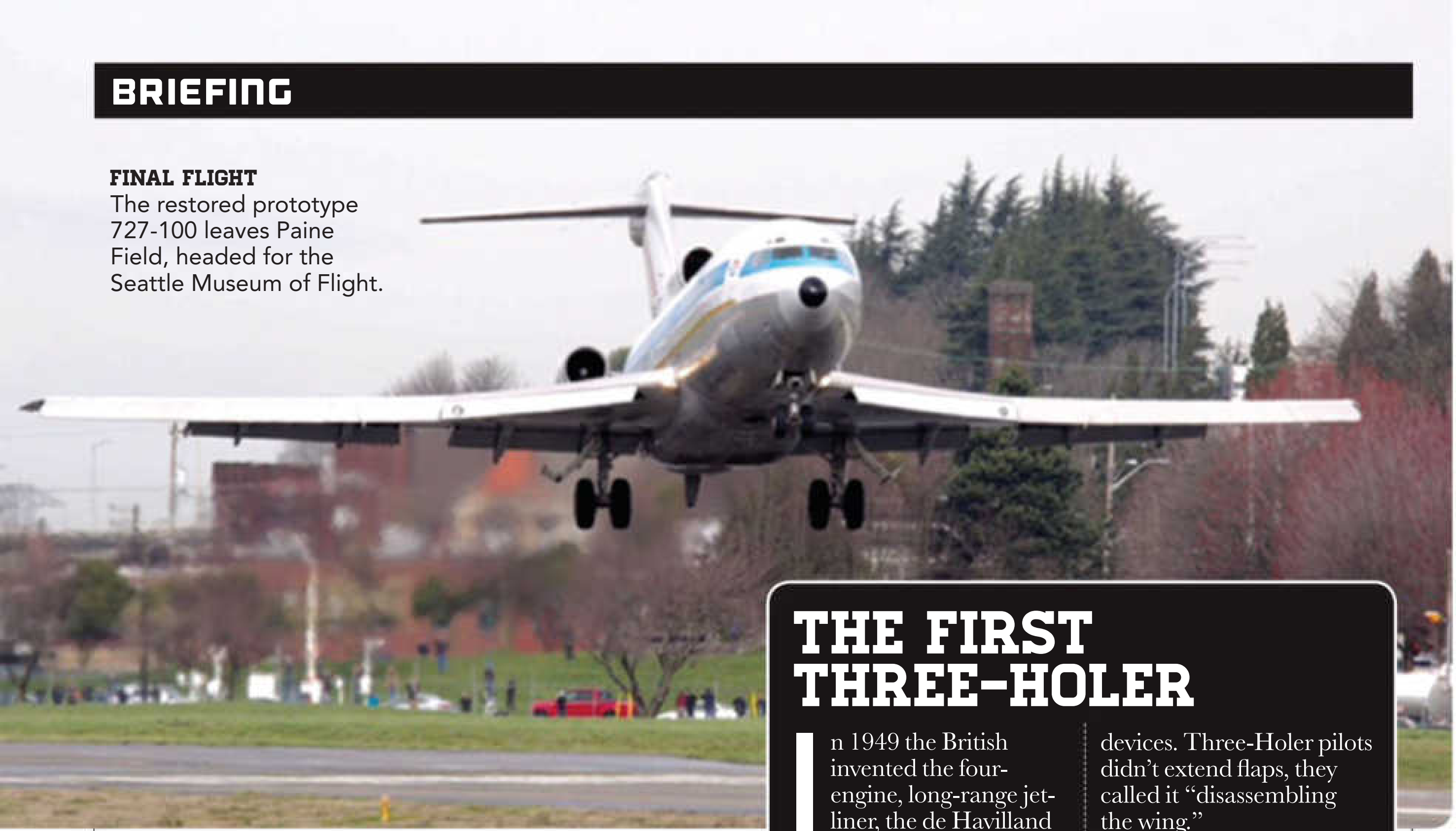
Offer Code ESB346-06
Please mention this code when you call.

GovMint.com • 14101 Southcross Dr. W. Dept. ESB346-06 • Burnsville, Minnesota 55337

Prices and availability subject to change without notice. Facts and figures deemed accurate as of February 2016. NOTE: GovMint.com® is a private distributor of worldwide government coin and currency issues and privately issued and licensed collectibles, and is not affiliated with the United States government. GovMint.com is not an investment company and does not offer financial advice or sell items as an investment. The collectible coin market is speculative, and coin values may rise or fall over time. All rights reserved. © 2016 GovMint.com.

GOVMINT.COM®

THE BEST SOURCE FOR COINS WORLDWIDE™



FINAL FLIGHT
The restored prototype 727-100 leaves Paine Field, headed for the Seattle Museum of Flight.

THE FIRST THREE-HOLER

In 1949 the British invented the four-engine, long-range jetliner, the de Havilland Comet. Nine years later, Boeing snatched away the prize with the 707. In 1962 de Havilland tried again and built the world's first smooth-wing, medium-range, short-runway trijet with a T tail and a trio of tail-mounted engines, one buried in the tailcone and two flanking it. They built just 117 DH Tridents before Boeing again copped the concept and ultimately manufactured 1,832 727s.

At one point, the British and Americans had considered building a joint-venture trijet design, but Boeing engineers believed they could design one to use 4,500-foot runways rather than the Trident's 6,000-foot capability. Boeing took advantage of the 727's unencumbered wing to mount full-span, triple-slotted flaps that origami'ed out from the entire trailing edge, plus Krueger flaps and extendable slats that ran from wing root to tip along each leading edge, thus allowing a slick, high-speed airfoil to become a hugely cambered collection of high-lift devices. Three-Holer pilots didn't extend flaps, they called it "disassembling the wing."

Unlike traditional designs, the very first 727-100 wasn't just a prototype but a working airplane. After spending a year as a test article, N7001U was cleaned up, repainted and sold to United Air Lines. It spent the next 64,495 flight hours cranking out more than $300 million in revenue for United against its $4.4 million purchase price. In 1991 the airplane was donated to the Museum of Flight, south of Seattle, but between United stripping the airframe of useful parts and years spent sitting on an airport ramp awaiting restoration, the airplane steadily deteriorated.

In 1999 serious restoration by a faithful crew of volunteers, many of them ex-Boeing employees, began. Two parts airplanes had been donated, one by Clay Lacy and the other from FedEx, and on March 2, the world's first 727 made its last flight—17 minutes from Paine Field, in Everett, Wash., to King County Airport, home of the Museum of Flight.

Stephan Wilkinson

MILESTONES

DESERT STORM 25TH ANNIVERSARY

Operation Desert Storm, the U.S.-led coalition's response to Iraqi strongman Saddam Hussein's invasion of Kuwait, started 25 years ago, on January 17, 1991. The first raid on Iraq's capital city of Baghdad was conducted by 10 F-117A Nighthawks of the 415th Tactical Fighter Squadron flying out of Khamis Mushait Air Base, in Saudi Arabia, targeting the Iraqi integrated air defense systems. Nighthawks attacked 31 percent of the initial targets, part of a multipronged force that struck dozens of targets during Desert Storm's opening hours. Fixed-wing aircraft in the U.S. strike force included F-14s, F-15s, F-16s, F-111s, F/A-18s, A-6s and B-52s, joined by a variety of coalition aircraft, including British Tornadoes. According to James P. Coyne's *Airpower in the Gulf*, "In that first night, more than 650 aircraft, including almost 400 strike aircraft, attacked Iraq." The onslaught proved so effective that by Desert Storm's sixth day, "electronic emissions from the radars controlling [Iraq's] SAMs, AAA, and early warning network had dropped off by ninety-five percent."

TOP: FRANCIS ZERA/THE MUSEUM OF FLIGHT, SEATTLE, WA; BOTTOM: U.S. AIR FORCE

Introducing **The new and revolutionary**

Jacuzzi® Hydrotherapy Shower.

AGING = PAIN

For many, arthritis and spinal disc degeneration are the most common source of pain, along with hips, knees, shoulders and the neck. In designing the Jacuzzi Hydrotherapy Shower, we worked with expert physicians to maximize its pain relieving therapy by utilizing the correct level of water pressure to provide gentle yet effective hydrotherapy.

JACUZZI® SHOWER = RELIEF

Four Jacuzzi® ShowerPro™ Jets focus on the neck, back, hips, knees and may help ease the pain and discomfort of:

- Arthritis
- Circulation Issues
- Aches and pains
- Neuropathy
- Sciatica
- Inflammation

The Jacuzzi® Hydrotherapy Shower provides a lifetime of comfort and relief… safely and affordably.

As we age, the occasional aches and pains of everyday life become less and less occasional. Most of us are bothered by sore muscles, creaky joints and general fatigue as we go through the day- and it's made worse by everything from exertion and stress to arthritis and a number of other ailments. Sure, there are pills and creams that claim to provide comfort, but there is only one 100% natural way to feel better… hydrotherapy. Now, the world leader in hydrotherapy has invented the only shower that features Jacuzzi® Jets. It's called the Jacuzzi® Hydrotherapy Shower, and it can truly change your life.

For over 50 years, the Jacuzzi® Design Engineers have worked to bring the powerful benefits of soothing hydrotherapy into millions of homes. Now, they've created a system that can fit in the space of your existing bathtub or shower and give you a lifetime of enjoyment, comfort and pain-relief. They've thought of everything. From the high-gloss acrylic surface, slip-resistant flooring, a hand-held shower wand, a comfortable and adjustable seat, to strategically-placed grab bars and lots of storage, this shower has it all.

Why wait to experience the Jacuzzi® Hydrotherapy Shower? Call now… it's the first step in getting relief from those aches and pains.

Call toll free now to get your FREE special report "Tips on Living to be 100"

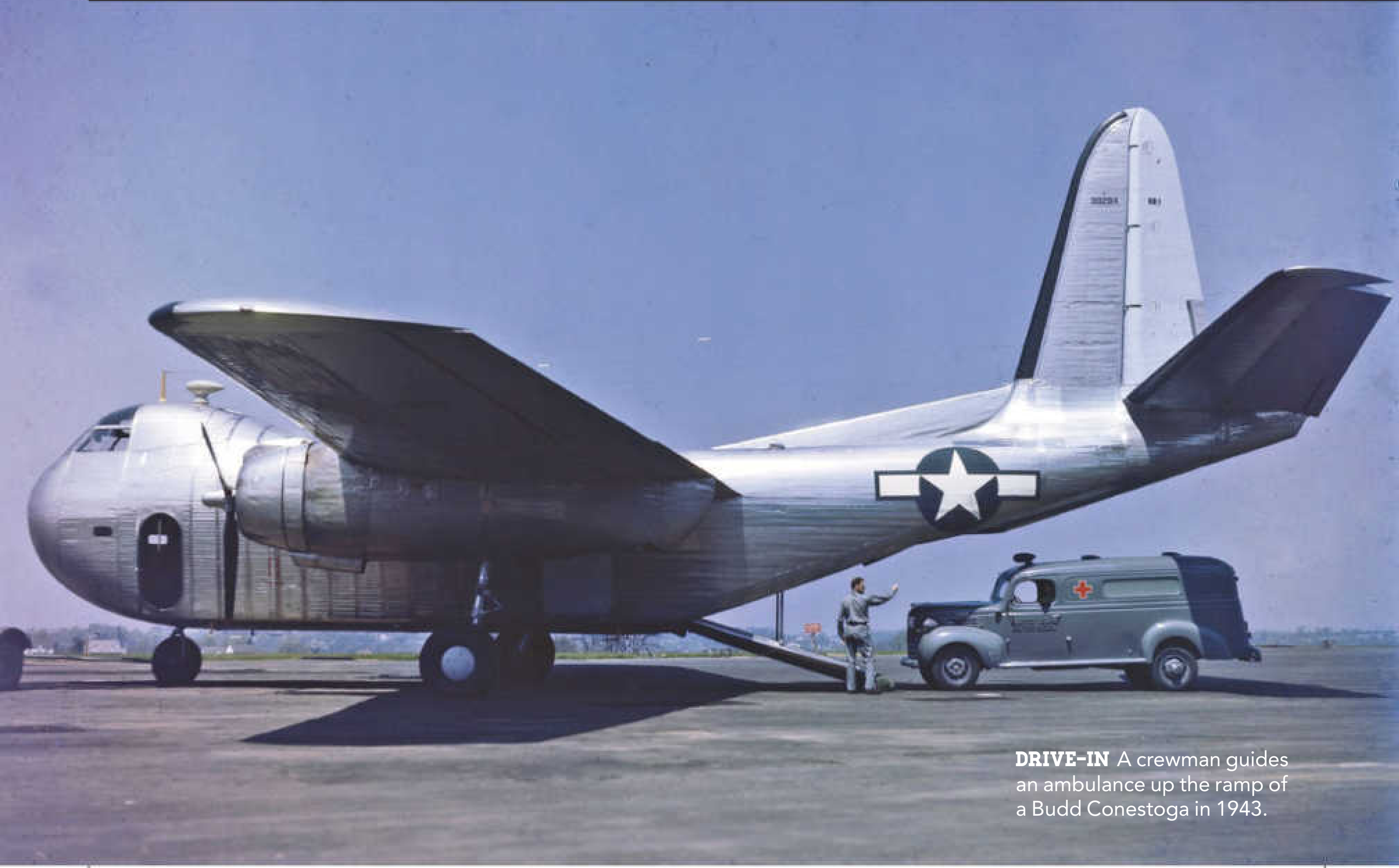
Mention promotional code 102595.

1-888-335-8145

Jacuzzi

© 2016 Aging In The Home Remodelers

82028



DRIVE-IN A crewman guides an ambulance up the ramp of a Budd Conestoga in 1943.

FLYING RAILROAD CAR

THE E.G. BUDD COMPANY DUBBED ITS STAINLESS STEEL CARGO PLANE THE CONESTOGA, BUT "PULLMAN" MIGHT HAVE BEEN MORE APT

BY ROBERT GUTTMAN

During World War II, the United States became the "Arsenal of Democracy," supplying vast numbers of vehicles, ships, aircraft and weapons to the U.S. armed forces and Allied nations. Not surprisingly, shortages of certain strategic raw materials were anticipated. Of particular concern was the supply of aluminum and light alloys needed for aircraft production. As a result, specific requests were issued to design aircraft manufactured from non-strategic materials that could be produced by companies outside the normal aircraft industry. Such sources were seen as particularly desirable for aircraft designated for second-line or non-combat uses, including training and transport. Of the many such airplanes developed, most were constructed using wood. But one manufacturer took the definition of "non-strategic materials" in a whole new direction.

STRONG PROFILE A WAVE and a WAC pose with an RB-1 at Budd Field in January 1945.

Philadelphia's E.G. Budd Company was not really part of the aviation industry. Founded in 1912, it had pioneered the fabrication of pressed-steel bodies for automobiles, and later manufactured stainless steel railroad passenger cars. In the early 1930s, however, Budd mechanical engineer Earl Ragsdale had come up with a new process for fabricating structures from stainless steel. Known as "shot welding," it allowed sheets of stainless steel to be welded together without distortion, and without any loss of their tensile strength or rust-resisting properties. The welded sheets also demonstrated twice the strength of riveted structures. In 1934 Budd won acclaim when it used its shot-welding technique to build the stainless steel cars for the nation's first "streamliner" passenger train, the revolutionary Burlington Zephyr.

Budd had also been branching out into aircraft manufacturing. In 1931 the firm built an amphibious biplane, modified from the Italian Savoia-Marchetti S.56 flying boat but fabricated using shot-welded stainless steel. Known as the BB-1 Pioneer, the aircraft failed to garner any sales or production orders, though it flew for about 1,000 hours in the U.S. and Europe before being donated to the Franklin Institute in Philadelphia, where it remains on display today.

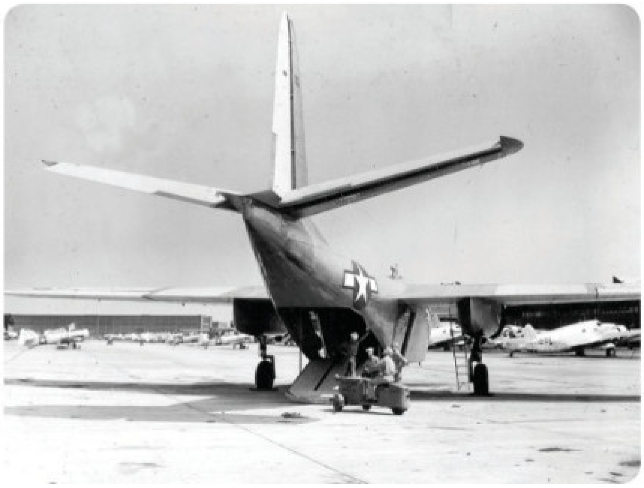
The Pioneer was the only airplane Budd produced until 1942, when it contracted with the Navy to develop a cargo plane manufactured entirely out of shot-welded stainless steel. Dubbed the Conestoga by the builder, Budd's design resulted in a 200-plane order from the Navy under the designation RB-1. The Army Air Forces also became interested, ordering 600 aircraft under its own designation, C-93.

Flown for the first time on Halloween 1943, the RB-1 was a twin-engine, high-wing monoplane. The only exceptions to its stainless steel construction were the fabric-covered trailing edges of the outer wing panels. The Conestoga had a wingspan of 100 feet, and was 68 feet long and 38 feet 9 inches high. The aircraft featured semi-retractable tricycle landing gear, with the retracted nosewheel protruding slightly beneath the forward fuselage. Power was provided by a pair of 1,200-hp Pratt & Whitney R-1830 Twin Wasp air-cooled radials. The Conestoga weighed 20,157 pounds empty and could take off at 33,861 pounds fully loaded. In place of cargo, it could accommodate 24 fully equipped paratroops or evacuate 24 stretcher cases.

Although the Conestoga was considered odd-looking in its day, it included a number of advanced design features. The flight deck of the three-man cockpit was raised above the fuselage, leaving an unobstructed 25-foot-long cargo area. The upswept tail with a retractable ramp, another revolutionary feature at the time, facilitated cargo loading and allowed vehicles to be driven directly on or off the plane. In fact, the basic layout of the Conestoga's fuselage was not unlike some cargo aircraft developed years later, including Fairchild's C-123 Provider and Lockheed's C-130 Hercules.

The Conestoga's structural strength earned it high marks, but pilots claimed its handling was reminiscent of the railroad cars its makers were more accustomed to producing. Though powered by the same engines used in Douglas' C-47, the RB-1 weighed 3,000 pounds more empty, making it relatively underpowered and less fuel efficient. And the Conestoga turned out to be more expensive to produce than the C-47.

THE RB-1 CONESTOGA TURNED OUT TO BE MORE EXPENSIVE TO PRODUCE THAN THE DOUGLAS C-47.



EASY ACCESS The RB-1's retractable loading ramp was an enduring innovation.

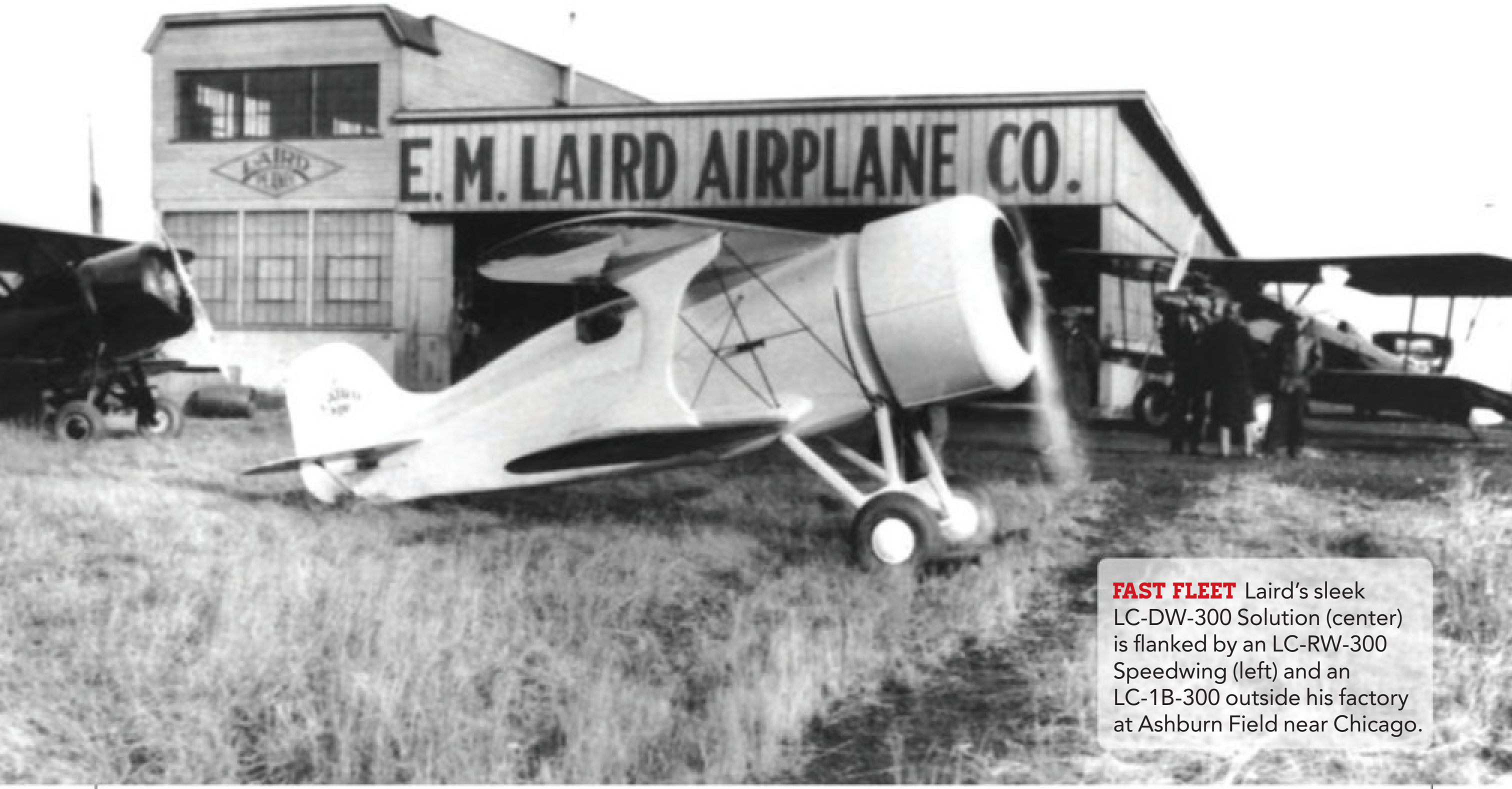
OPPOSITE: (TOP) NATIONAL AIR AND SPACE MUSEUM, (BOTTOM) TEMPLE UNIVERSITY. URBAN ARCHIVES, PHILADELPHIA, PA; RIGHT: SAN DIEGO AIR & SPACE MUSEUM

Another complaint was the deafening noise level inside the RB-1's voluminous stainless steel fuselage, which acted like an echo chamber. One former crewmember described it as like being inside a bass drum.

A sufficient supply of aircraft aluminum turned out to be the final nail in the Conestoga's coffin. C-47s continued to pour off the assembly lines by the thousands. As a result, the Army canceled its C-93 order and the Navy reduced its RB-1 order to 25 airplanes, of which only 17 were delivered.

Although the Conestoga was the Budd Company's last foray into aircraft manufacturing, the firm produced railway coaches until 1978, when it was taken over by the German Thyssen Allgemeine Gesellschaft. During the 1980s the company was reorganized, closing down its Philadelphia facility and phasing out railroad car production, but it remained in business in Troy, Mich., manufacturing auto body components.

Most of the 17 Conestogas built went straight from the manufacturer to storage. Soon after the war ended, the War Assets Administration offered them for sale as surplus. Fourteen were purchased by the National Skyway Freight Corporation, later known as the Flying Tiger Line, for use as commercial air freighters until the early 1950s. A few found their way to South America, continuing to serve as freighters. A single surviving example of the Budd Conestoga can be seen today at the Pima Air Museum in Tucson, Ariz., where it is currently awaiting restoration. ✢



FAST FLEET Laird's sleek LC-DW-300 Solution (center) is flanked by an LC-RW-300 Speedwing (left) and an LC-1B-300 outside his factory at Ashburn Field near Chicago.

FEEDING THE NEED FOR SPEED

MATTY LAIRD'S CAREER DESIGNING CUSTOM BIPLANES EARNED HIM A PLACE OF HONOR IN THE ANNALS OF AMERICAN AERONAUTICS

BY EDWARD H. PHILLIPS

When Emil Matthew Laird left his hometown of Chicago and relocated to Wichita, Kan., in 1919, he helped initiate the city's transformation from "Wheat Capital" to "Air Capital of the World." A self-taught pilot and designer, "Matty" Laird had already been building airplanes for eight years by then. His latest design—a three-place, open-cockpit biplane powered by the ubiquitous war-surplus Curtiss OX-5 engine—possessed one important feature: room for two passengers in the front cockpit.

Kansas oil tycoon Jacob Melvin Moellendick had lured Laird away from the "Windy City" with an offer too tempting to resist—funding and a place to build his airplanes. Moellendick believed there was a potential market for commercial aircraft, and that Wichita was the ideal location for an airplane company. Laird set up shop in an abandoned building in the heart of the city, while he and Moellendick secured land to build another facility at a flying field to the north. Laird's new airplane, dubbed the Swallow, made its first flight in April 1920. It performed well, resulting in orders from air taxi operators throughout the Midwest.

There was a growing demand for a new commercial airplane in the U.S. at that point. Though World War I Curtiss JN-4s and other surplus trainers were relatively inexpensive and plentiful, they were clearly obsolete. Small, homegrown companies across the country had begun building new aircraft or modifying war-weary planes for commercial sale. The Laird Swallow, however, represented a bold step in the right direction, despite its relatively high price of $6,500.

During Matty's three years in Wichita, more than 40 Swallows were built. But while his planes were selling well, Laird's business relationship with Moellendick was eroding, and by the summer of 1923 the situation had become intolerable. That October Laird returned to Chicago, where he reestablished himself as a custom airplane manufacturer.

Early in 1924, the E.M. Laird Airplane Company was doing business in rented facilities near Ashburn Field, where Matty had spent his early years as a pilot and builder. Knowing that the Swallow could no longer compete in an increasingly crowded marketplace, Laird responded with a new design, the Commercial, a three-place, open-cockpit biplane powered by an OX-5 engine enclosed in a streamlined, all-metal cowling. Though the Commercial was well received, demand for the new plane remained low, and only a few were built over the next three years. Laird's infant company was losing money.

In 1926 sweeping changes began affecting the fledgling aviation industry, as the U.S. government recognized that the aviation business had grown to the point where it needed to be regulated. The new Air Commerce Act required licensing of pilots and mechanics, as well as registration of aircraft. In addition, and of particular interest for financially strapped manufacturers such as Laird, all aircraft had to comply with minimum airworthiness standards and be certified by the federal government.

In May 1927, America's aviation industry was catapulted to new heights after Midwestern airmail pilot Charles Lindbergh flew a Ryan monoplane nonstop across the North Atlantic to Paris, winning the $25,000 Orteig Prize. "Lucky Lindy" and his *Spirit of St. Louis* ushered in the dawn of aviation's golden age. In the wake of his historic flight, Matty Laird's business exploded.

Laird was quick to capitalize on the flying fever that swept the country during the late 1920s. His firm introduced new designs such as the LC-B and LC-1B, the powerful LC-R, plus special racing models, including the LC-DW-300 Solution, which won the 1930 Thompson Trophy Race with Charles W. "Speed" Holman at its controls. In 1931 Laird's solid reputation as a builder of racing biplanes led to construction of the powerful LC-DW-500 Super Solution, flown to victory in the Bendix cross-country race by James H. "Jimmy" Doolittle.

The last new design Laird produced before the stock market crash of 1929, designated the LC-DE, was smaller than the LC-B and LC-R, but soon proved popular with sportsman and amateur racing pilots who could still afford to fly. Following the Wall Street debacle, new airplanes sales plummeted. Many aviation companies closed their doors, but Laird managed to hold on by a thread thanks to a few wealthy sportsman pilots who ordered biplanes built to their specific requirements.

In 1931 Matty introduced the LC-EW-450, a six-place cabin sesquiplane featuring a first for a Laird design up to that time: an all-metal, semi-monocoque fuselage. Although it was an advanced design with good potential, it proved to be too expensive for Depression-era operators, and only one was built.

WINNING FORMULA Jimmy Doolittle flew the Laird Super Solution (above) to victory in the 1931 Bendix race. Laird built his first airplane (below) in his Chicago home in 1913.

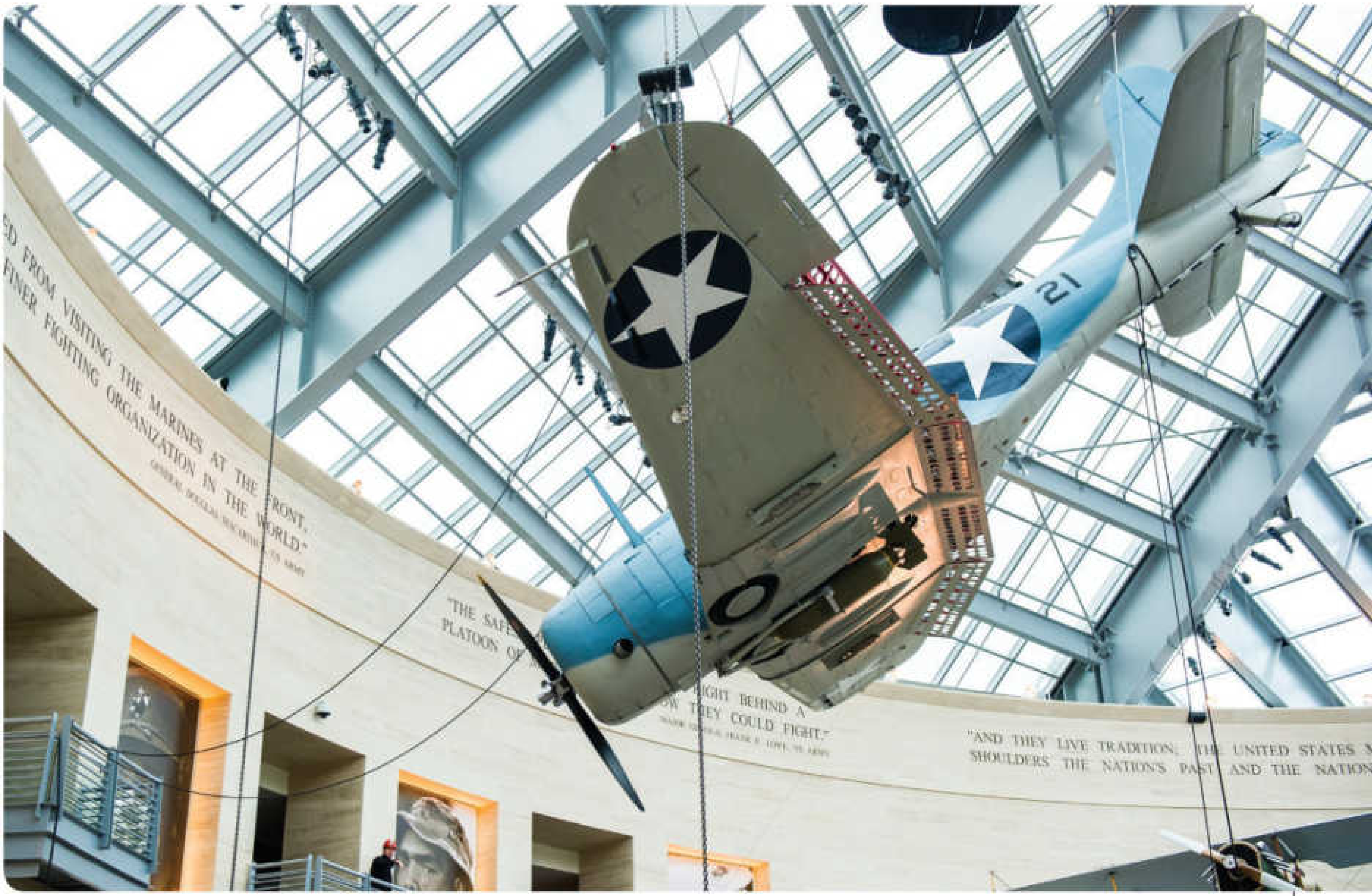
OPPOSITE: SAN DIEGO AIR & SPACE MUSEUM; ABOVE RIGHT: ©AVIATION HISTORY COLLECTION/ALAMY; RIGHT: JOAN LAIRD POST/EDWARD H. PHILLIPS COLLECTION

Laird won contracts from American Airlines, TWA, Braniff and United Air Lines to repair mechanical components during the 1930s, but he never lost his taste for speed. In 1937 he teamed up with flamboyant air racer Roscoe Turner. With only a few months left before the National Air Races began that September, Matty and his team worked to Turner's specifications to completely rebuild the wrecked Wedell-Williams Model 44 racer. They also modified the Turner Special, a new, untested monoplane powered by a 14-cylinder Pratt & Whitney Hornet radial rated at a bellowing 1,000 hp and designated the LTR-14 (Laird/Turner Racer).

Turner had gained fame by winning the 1934 Thompson Trophy Race in his Wedell-Williams monoplane, and hoped to win again in 1937 in the LTR-14. But he placed third, later citing Laird's work on the fuel tank among the reasons for his failure. Turner had promised Matty that he would use his anticipated earnings from the Thompson Trophy and Bendix races to pay for the work done on the two racers. Although initially reluctant, Laird agreed to wait for payment. According to his daughter, Joan Laird Post, Turner never paid that debt, and the two men subsequently parted company. Turner and the LTR-14 went on to win the 1938 and 1939 Thompson races, thus earning permanent possession of the Thompson Trophy. But Laird received no publicity for his work on the airplane, and as a final insult, the Laird company logo was removed from the LTR-14.

During World War II, Laird worked as an engineer for the LaPorte Corporation, which built B-26 tail sections and airframe assemblies for the B-24. After the war Laird considered building a four-place, high-wing monoplane, but decided against the plan. His 30-year involvement with aviation ended in 1945.

E.M. Laird died in 1982, leaving a legacy of speed and a reputation for building superior custom airplanes that had earned the respect of both customers and competitors. Above all, the self-taught pilot and designer had earned the right to be called one of America's great aviation pioneers. ✈


SD FROM VISITING THE MARINES AT THE FRONT,
FINER FIGHTING ORGANIZATION IN THE WORLD."
"THE SAFE
PLATOONS OF
IGHT BEHIND A
W THEY COULD FIGHT."
"AND THEY LIVE TRADITION; THE UNITED STATES M
SHOULDERS THE NATION'S PAST AND THE NATION
21

RAISED FROM A WATERY GRAVE

LOST IN LAKE MICHIGAN FOR NEARLY HALF A CENTURY, A MARINE CORPS SBD DAUNTLESS HAS FINALLY COME HOME TO QUANTICO

BY MARK CARLSON

The tough little Douglas SBD Dauntless dive bomber remains one of the most revered and recognizable warbirds in American history. This is the remarkable story of how one SBD-3 recently ended up on display at the National Museum of the Marine Corps in Quantico, Va., after spending 48 years underwater.

The U.S. Navy modified two Great Lakes paddle-wheeler steamers during World War II to act as aircraft carriers for training fledgling aviators. Not every pilot attempting to land on the tiny wooden decks of USS *Sable* and USS *Wolverine* managed to do so, however. Between August 1942 and the end of the war, more than 140 fighters and bombers ended up in Lake Michigan's cold gray waters.

SBD-3 no. 06583 rolled out of Douglas Aircraft's El Segundo, Calif., plant in August 1942, the 610th Dauntless built. After being assigned first to Marine Scout Bombing Squadron 132 (VMSB-132), then to VMSB-142, it was given to VMSB-243 and VMSB-232. For reasons that are still unclear, the aircraft never went overseas. Though it had originally been a Marine plane, the Navy claimed it for the Training Command at NAS Glenview, Ill., in October

HOME TO ROOST Volunteers, including Rick Niedner (on wing), reattach the SBD-3's engine (above), before the Dauntless is installed in the Leatherneck Gallery (top).

1943. Two weeks later it was at the bottom of Lake Michigan, where it remained for nearly five decades.

In June 1991, the Navy pulled the SBD out of the lake and handed it over to Black Shadow Aviation for restoration in Jacksonville, Fla. The airplane was prepared for display, though little was done toward returning it to functional condition. But Black Shadow's crew deserves recognition for saving the Dauntless from total decay. Completed in June 1993, it was put on display at the National Museum of Naval Aviation in Pensacola.

Soon after that, however, Pensacola gained a very rare combat veteran SBD, no. 2106, which had been at the Battle of Midway. The Navy then handed over 06583 to the USS *Alabama* Memorial Museum. In April 2005, the well-traveled SBD-3 at last came home to the Marine Corps museum at Quantico.

At the museum's restoration facility, a team of dedicated volunteers began a painstaking examination of the aircraft. Specialist Rick Niedner, who has spent six years on the restoration of the old warbird, is a 30-year Marine veteran who specializes in aircraft electronics. "My association with the museum started in 2004," Niedner noted. "At the time the restoration team was small, only about seven of us. I had the least experience in metalworking, but I learned fast. I wanted to do as much as I could for the project. It has taken far longer than we ever imagined. We have been working on this aircraft since April 2010."

Some perplexing mysteries surround this Dauntless. For one thing, why was a new SBD pulled from service to be sent to Jacksonville, where it underwent what were listed as "undisclosed modifications"? Why was it then sent to Illinois to train aviators for carrier qualifications? We may never know the answers to those questions, but some clues were found during the restoration work.

"We began by taking the aircraft down to its last rivet and found a lot of interesting anomalies," said Niedner. "We found some damage in the starboard fuselage between the horizontal stabilizer and the wing. We asked the Navy if we could see some photos of the plane after it was lifted from the water. They showed a big jagged hole about three feet square on the starboard side. I think a boat or ship got its anchor caught on the plane and tore a hole in it."

Black Shadow did not attempt to rebuild any of the structural frames, but riveted a large patch over the hole. It was a smooth, neat job, though the SBD's structural integrity was compromised. "That's where I got my metalwork training," Niedner said, "because I had to make new ribs. We built wooden molds from the original blueprints and put the metal into the molds. We actually had to make everything from Frame 12 to Frame 15. After pounding the metal into the desired shape, the new frame was installed to replace the missing part." Niedner's pride in his work is evident. "When you look inside that plane now you see nothing but pristine structure. There is a great amount of personal satisfaction for the people involved in the restoration. We have dealt with every type of metal corrosion known to man, and have learned that original blueprints can be trusted only so far and that Rosie the Riveter did good work."

VETERAN DOCENT
Major Jack Elliott handled ordnance for Marine Corps SBDs during World War II.

"WE BEGAN BY TAKING THE AIRCRAFT DOWN TO ITS LAST RIVET AND FOUND A LOT OF INTERESTING ANOMALIES."

Among other incongruities, Niedner said, "We found evidence that extensive repairs had been made to both pilot's rudder pedal heel trays." There are no records to indicate how the damage occurred, but considerable force would have been required to bend these structures. It is possible the aircraft had undergone severe stresses during a dive, thus rendering it unfit for combat operations. Other discrepancies involved fuel lines and nonstandard additions to or omission from the electrical system.

"From the beginning it was our intention to restore the SBD to be as perfect inside and outside as possible," he continued. "We wanted it so that any student of WWII aircraft could enter the cockpit and see every wire, cable, switch and line exactly where it was supposed to be. In effect, we wanted a three-dimensional blueprint of a wartime Dauntless."

The main landing gear has been successfully cycled manually. The dive-brake and landing-flap actuating mechanism is also operational.

"The centerline bomb rack was still in the airplane," reported Niedner. "We have restored the bomb rack and have a fiberglass 1,000-pound bomb for display. The wing bomb stations were missing, but we were able to locate some damaged bomb rack fairings in Phoenix, Ariz., and reworked them to fit onto the wings. We had to anneal, reshape and then re-temper them to fit. We did have an almost intact flexible gun mount in the museum's ordnance collection, but we did not want to mount real guns. It's a pain having to do physical inventory on them every year."

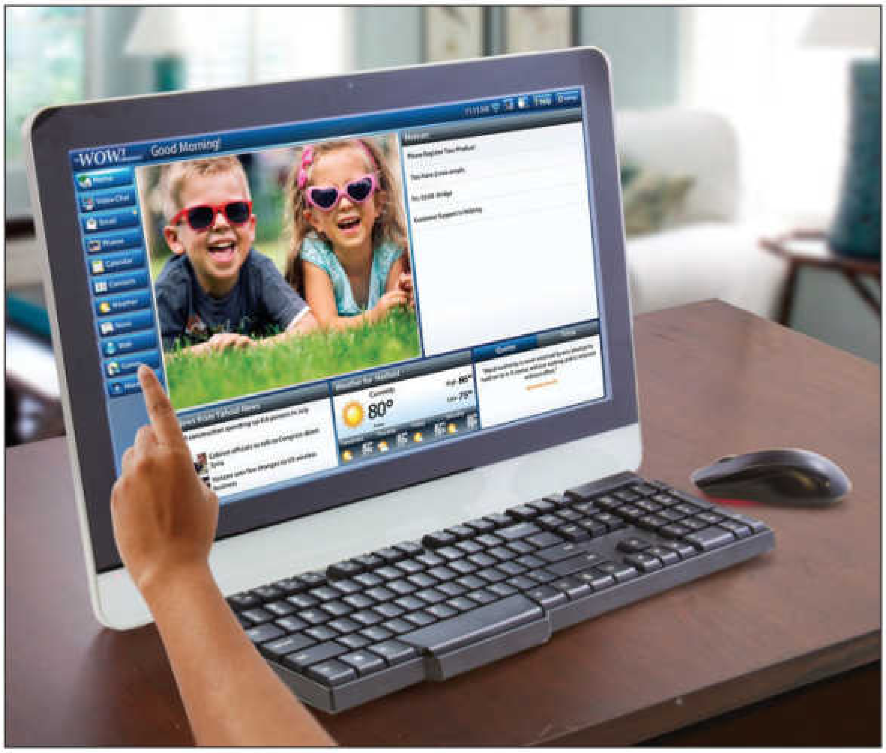
The Marine Corps museum bought two .30-caliber Browning machine gun replicas to be fitted into the Dauntless' rear cockpit and two .50-caliber replicas for the front. The dive bomber has been painted to represent the SBD-3 flown to Henderson Field by Lt. Col. Richard Mangrum, CO of VMSB-232, on August 20, 1942. Since this airplane was originally assigned to that squadron, it has returned home in a way. After six years of painstaking work by a dedicated team, SBD-3 no. 06583 has at last returned from the deep. The completed airplane can now be seen in the museum's Leatherneck Gallery. ✢

OPPOSITE TOP & RIGHT: U.S. MARINE CORPS; OPPOSITE BOTTOM: IKE COPPERTHITE

TECHNOLOGY SIMPLIFIED – BIGGER AND BETTER

Wow! A Simple to Use Computer Designed Especially for Seniors!

Easy to read. Easy to see. Easy to use. Just plug it in!



NEW

Now comes with...

Larger 22-inch hi-resolution screen – easier to see
16% more viewing area

Simple navigation – so you never get lost

Intel® processor – lightning fast

Computer is in the monitor – No bulky tower

Advanced audio, Better speaker configuration – easier to hear

Text to Speech translation – it can even read your emails to you!

U.S. Based Customer Service

FREE
Automatic Software Updates

> *"I love this computer! It is easy to read and to use! I get photo updates from my children and grandchildren all the time."*
> – Janet F.

Have you ever said to yourself "I'd love to get a computer, if only I could figure out how to use it." Well, you're not alone. Computers were supposed to make our lives simpler, but they've gotten so complicated that they are not worth the trouble. With all of the "pointing and clicking" and "dragging and dropping" you're lucky if you can figure out where you are. Plus, you are constantly worrying about viruses and freeze-ups. If this sounds familiar, we have great news for you. There is finally a computer that's designed for simplicity and ease of use. It's the WOW Computer, and it was designed with you in mind. This computer is easy-to-use, worry-free and literally puts the world at your fingertips. From the moment you open the box, you'll realize how different the WOW Computer is. The components are all connected; all you do is plug it into an outlet and your high-speed Internet connection. Then you'll see the screen – it's now 22 inches. This is a completely new touch screen system, without the cluttered look of the normal computer screen. The "buttons" on the screen are easy to see and easy to understand. All you do is touch one of them, from the Web, Email, Calendar to Games– you name it… and a new screen opens up. It's so easy to use you won't have to ask your children or grandchildren for help. Until now, the very people who could benefit most from E-mail and the Internet are the ones that have had the hardest time accessing it. Now, thanks to the WOW Computer, countless older Americans are discovering the wonderful world of the Internet every day. Isn't it time you took part? Call now, and you'll find out why tens of thousands of satisfied seniors are now enjoying their WOW Computers, emailing their grandchildren, and experiencing everything the Internet has to offer. Call today!

- Send & Receive Emails
- Have video chats with family and friends
- Surf the Internet:
  Get current weather and news
- Play games Online:
  Hundreds to choose from!

Call now toll free and find out how you can get the new WOW! Computer.

Mention promotional code 103112 for special introductory pricing.

1-888-878-3134

The WOW! Computer

© 2016 *first*STREET for Boomers and Beyond, Inc.

81059

LETTER FROM AVIATION HISTORY

THE TRUTH IS OUT THERE

BY CARL VON WODTKE

AREA 51 UFO
The second "Have Blue" technology demonstrator aircraft, predecessor of the F-117, flies over the Groom Lake area in the late 1970s.

LOCKHEED MARTIN

On April 12, 1955, legendary Lockheed designer Clarence "Kelly" Johnson flew over the Nevada desert with a CIA officer and a U.S. Air Force colonel in a Beechcraft Bonanza piloted by Lockheed's chief test pilot, Tony LeVier. Johnson was searching for a secluded site where he could test an airplane so secret that few outside his Skunk Works division knew it existed: the U-2 high-altitude reconnaissance plane. As recounted in a secret CIA history declassified in 2013, they spotted a former Army Air Corps airstrip next to a salt flat known as Groom Lake, some 85 miles northwest of Las Vegas. Although the strip appeared to be paved, LeVier elected to land on the dry lakebed instead. When the four men walked over to examine the strip, they discovered it was unpaved and covered in ankle-deep dirt. Had they attempted to land on it, the CIA historians speculated, "the plane would probably have nosed over when the wheels sank into the loose soil, killing or injuring all the key figures in the U-2 project."

Despite the need to improve the runway, Johnson and the other men agreed that it was the ideal site to test the U-2 and train its pilots. Lockheed subsequently built up the facility, which Johnson dubbed Paradise Ranch, later shortened to the Ranch, in an effort to make it sound more attractive to the employees who would work there. The location, adjacent to the Atomic Energy Commission's Nevada Test Site, was officially known by its map designation—Area 51—and thus a legend was born.

It wasn't long before reports of UFOs began to stream in from airline pilots unaccustomed to seeing flying objects over the desert above 60,000 feet, at that time an unheard-of altitude for aircraft. Later, when Lockheed tested the A-12, precursor to the SR-71, at Groom Lake during the Oxcart program, it generated similar reports given its 95,000-foot ceiling. According to the CIA history, "U-2 and later Oxcart flights accounted for more than one-half of all UFO reports during the late 1950s and most of the 1960s."

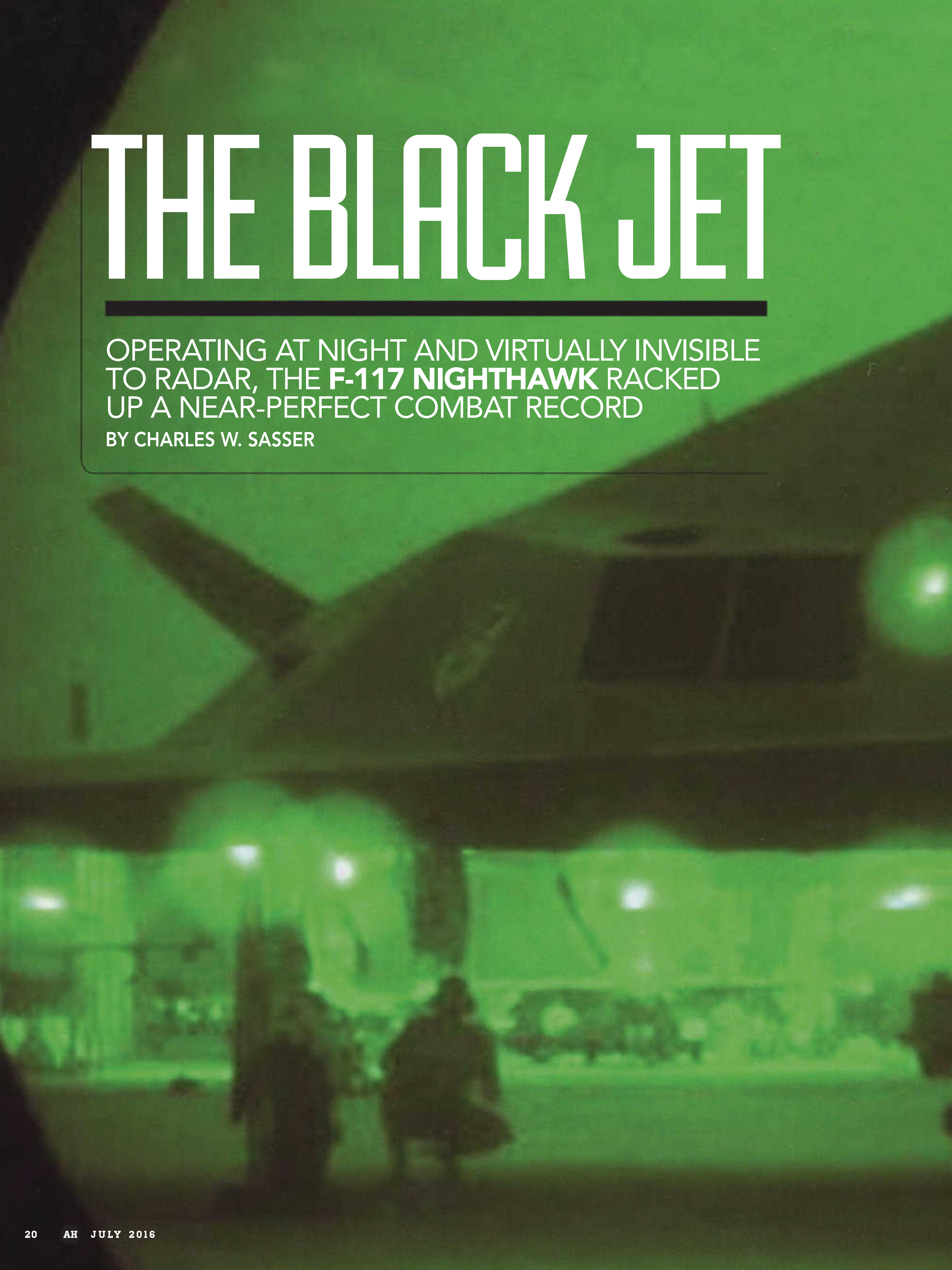
But the reports didn't end there. In the late 1970s, a new Lockheed black jet arrived at Groom Lake, one seemingly tailor-made to feed the growing UFO frenzy: the F-117A Nighthawk. Operating strictly at night and practically invisible to radar, the oddly shaped "stealth fighter"—in reality a ground-attack bomber—looked like no other airplane of this world. As Charles W. Sasser writes in "The Black Jet" (P. 20), "In 1981, when the Nighthawk made its maiden flight, residents in the dark areas outside the glow of cities revived the old UFO rumors by whispering of shadows and mysterious lights in the sky." The top-secret F-117 would not be officially revealed to the public until November 1988, and it would not truly enter the public consciousness until it played a leading role in Operation Desert Storm in 1991 (see "Milestones," P. 10).

To read the full unclassified CIA history about the origins of Area 51, visit The National Security Archive website at nsarchive.gw.edu and search for "The Secret History of the U-2 – and Area 51." For more on the aircraft developed and tested at Groom Lake, see Bill Yenne's excellent 2014 book *Area 51 Black Jets*. And look for a full-length feature on the U-2, the airplane that started it all, in an upcoming issue. ✈

THE BLACK JET

OPERATING AT NIGHT AND VIRTUALLY INVISIBLE TO RADAR, THE **F-117 NIGHTHAWK** RACKED UP A NEAR-PERFECT COMBAT RECORD

BY CHARLES W. SASSER



NIGHTHAWK IN ITS ELEMENT
Using a night vision image intensifier, a photographer captured this ghostly view of crews in Kuwait readying a Lockheed F-117A for a mission over southern Iraq in 1998.

THE SECRET IS OUT
An F-117A arrives in Italy (above) in 1999 to support operations over the former Republic of Yugoslavia and Kosovo. Lt. Col. William "Brad" O'Connor (opposite) poses with a Nighthawk after completing his training.

AFTER CROSSING THE SERBIAN BORDER AT 18,000 FEET, U.S. AIR FORCE LIEUTENANT COLONEL WILLIAM "BRAD" O'CONNOR'S **F-117 NIGHTHAWK** INITIATED A COMPUTER-PROGRAMMED HARD TURN WEST of the night lights of Belgrade, toward his primary target, the Baric munitions plant on the Sava River. He completed his stealth check by flipping the "inert" switch to pressurize the empty volume in his fuel tanks with nonflammable gas, to help suppress fire if he was hit.

Just then the excited voice of an F-16 pilot flying cover burst over the net: "Heavy triple A west of the city at medium altitude!"

Streams of silvery anti-aircraft rounds swung back and forth like spray from a garden hose to the right of O'Connor's flight path. The heavier stuff, 57mm, was a deep reddish color with a tinge of yellow. O'Connor pitied the poor schmucks over in that zone until he suddenly realized his next programmed turn took him directly into the thick of it.

A minute later, his bull's-eye display provided even more chilling news. "I'm the only one here," he realized. "They're shooting at *me*!"

The Nighthawk was the world's most invisible attack bomber; radar was nearly blind to it. So what the hell was going on? Some guy down there with a $200 pair of night-vision goggles?

It was April 17, 1999—almost three weeks into NATO's air campaign against Slobodan Milošević's Serbs in Kosovo, and O'Connor's sixth sortie in a war that was not a "war." The White House under President Bill Clinton specifically ordered all agencies to avoid using the words "war" or "combat." Action was to be referred to as "strikes."

The latest round of carnage in the former Republic of Yugoslavia involved the ethnically Serbian part of Kosovo under Milošević against the ethnic Albanians and their rebel KLA, or Kosovo Liberation Army. Armed violence broke out in early 1998. Massacres and terror attacks either killed or displaced nearly a million Kosovo Albanians.

On March 23, 1999, NATO Secretary General Javier Solana directed the supreme allied commander Europe, U.S. General Wesley Clark, to initiate air operations against the Federal Republic of Kosovo, with the objective of rendering Milošević incapable of continuing his persecution of ethnic Albanians, who were legally Kosovars in international eyes. Led by the U.S., NATO began bombing key targets the next night with 1,000 aircraft operating out of bases in Italy and Germany and from the aircraft carrier USS *Theodore Roosevelt* in the Adriatic Sea. It was to be the first U.S. conflict fought entirely from the air and the largest sustained action since Vietnam, with more than 38,000 combat sorties in 78 days from March 24 to June 11. Lockheed's F-117 Nighthawk played a major role in the campaign.

Long before O'Connor ever set eyes on the top-secret Nighthawk, he and other Air Force pilots training out of air bases at Nellis, Holloman and Tonopah next door to Area 51

PREVIOUS PAGES: GREG L. DAVIS/AFP/GETTY IMAGES; LEFT: U.S. AIR FORCE; RIGHT: COURTESY OF LT. COL. WILLIAM B. O'CONNOR (USAF, RET.)

knew *something* flew at night out there over the New Mexico and Nevada deserts. The area formed the epicenter for secret post–World War II experiments in warplanes and spacecraft.

V-2 rocket tests in the late 1940s carrying chimpanzees wearing little spacesuits went wildly astray on occasion and crashed. Anthropomorphic dummies dressed in experimental spacesuits were regularly pitched out of a variety of airplanes and balloons. A manned extreme-altitude balloon crashed near Roswell. In 1981, when the Nighthawk made its maiden flight, residents in the dark areas outside the glow of cities revived the old UFO rumors by whispering of shadows and mysterious lights in the sky.

Flying the F-117 remained top secret for more than a decade. Like a vampire, it came out only at night so it wouldn't be seen. Flights were canceled if the moon was too bright. Pilots were forbidden to tell even their families what they were doing.

Early in 1998, the assignments officer at "The Porch" personnel center advised Lt. Col. O'Connor of his next assignment: "Congratulations. You got the Black Jet you asked for. Learn to be comfortable with the night."

Seeing the bird for the first time, O'Connor walked around it with an awestruck expression. His first impression was that a demented diamond cutter must have carved it out of a very large chunk of coal. It was matte black, hulking, low and uneasy on the ground. Not a single curve on the entire fuselage to make it aerodynamically normal. Nothing but black facets. Something out of a sci-fi movie.

Although commonly referred to as a "stealth fighter," the plane was strictly intended for ground attack and performed superbly against Iraqi forces during the 1991 Gulf War. It flew 1,300 sorties and scored direct hits on 1,600 high-value targets without losing a single aircraft. In fact, since the stealthy F-117 operated at night, no enemy could claim to have actually seen one. Leaflet drops on Iraqi forces displayed it in an eerie stylized version destroying ground targets with the warning below: "Escape now and save yourselves."

Seventeen pilots successfully completed Nighthawk training in 1998 to become members of the F-117 fraternity. Each was assigned a "bandit number." O'Connor's was 545, which meant he was the 395th pilot in the series to fly the jet, since bandit numbering began at 150. More NFL players have suited up on any given Sunday than the total number of pilots ever privileged to fly the Nighthawk.

FLYING THE F-117 REMAINED TOP SECRET FOR MORE THAN A DECADE. PILOTS WERE FORBIDDEN TO TELL EVEN THEIR FAMILIES WHAT THEY WERE DOING.

O'Connor was assigned to the 8th Fighter Squadron, which traced its lineage back to WWII as the 49th Group's famed "Black Sheep." Within the year he would be flying his first strikes over Kosovo—his baptism of fire.

The closest O'Connor had come to combat previously was being assigned to Operation Southern Watch in 1996, flying the EF-111 out of Saudi Arabia to enforce the no-fly zone against Saddam Hussein. Before that, in 1993, two years after the Gulf War, he pulled a tour in Egypt training Egyptian pilots to fly F-16s.

The project to develop a combat aircraft with a low radar signature that led to the birth of the F-117 began in 1974 when the U.S. Defense Advanced Research Projects Agency (DARPA) launched Project Harvey, so-named after the invisible white rabbit from the play and movie. Lockheed Aircraft's "Skunk Works," the official alias for the department responsible for highly secret advanced development projects, soon took up the mission.

Skunk Works had arrived on the aircraft scene in 1943 and soon became famous for building small fleets of extremely advanced warplanes such as the P-80, America's first operational jet fighter; the F-104 Starfighter, the only fighter of the period capable of exceeding Mach 2; the high-flying U-2 spy plane of the Cold War; and the SR-71 Blackbird Mach 3 reconnaissance plane. Legendary Lockheed aircraft designer Kelly Johnson suggested the new radar-invisible stealth project should be patterned to resemble a flying saucer, which would most assuredly have contributed to rumors of alien landings if it were spotted test-flying in Area 51 airspace.

Johnson retired before the project was completed, and engineer Ben Rich succeeded him as director of Skunk Works. Along with engineers Denys Overholser and Bill Shroeder, he stumbled upon a paper published by Pyotr Ufimtsev, the Soviet Union's chief scientist at the Moscow Institute of Radio Engineering. Titled "Method of Edge Waves in the Physical Theory of Diffraction," the paper discussed optical scattering of electromagnetic waves bouncing off variously shaped objects. To Overholser it suggested that individual plates could be offset and reoriented to deflect radar waves away from an aircraft,

TECH NOTES LOCKHEED F-117A NIGHTHAWK

SPECIFICATIONS

ENGINE
2 General Electric F404-GE-F1D2 low bypass turbofan engines, at 10,800 pounds thrust each

WINGSPAN
43 ft. 4 in.

WING AREA
479 square feet

LENGTH
65 ft. 11 in.

HEIGHT
12 ft. 5 in.

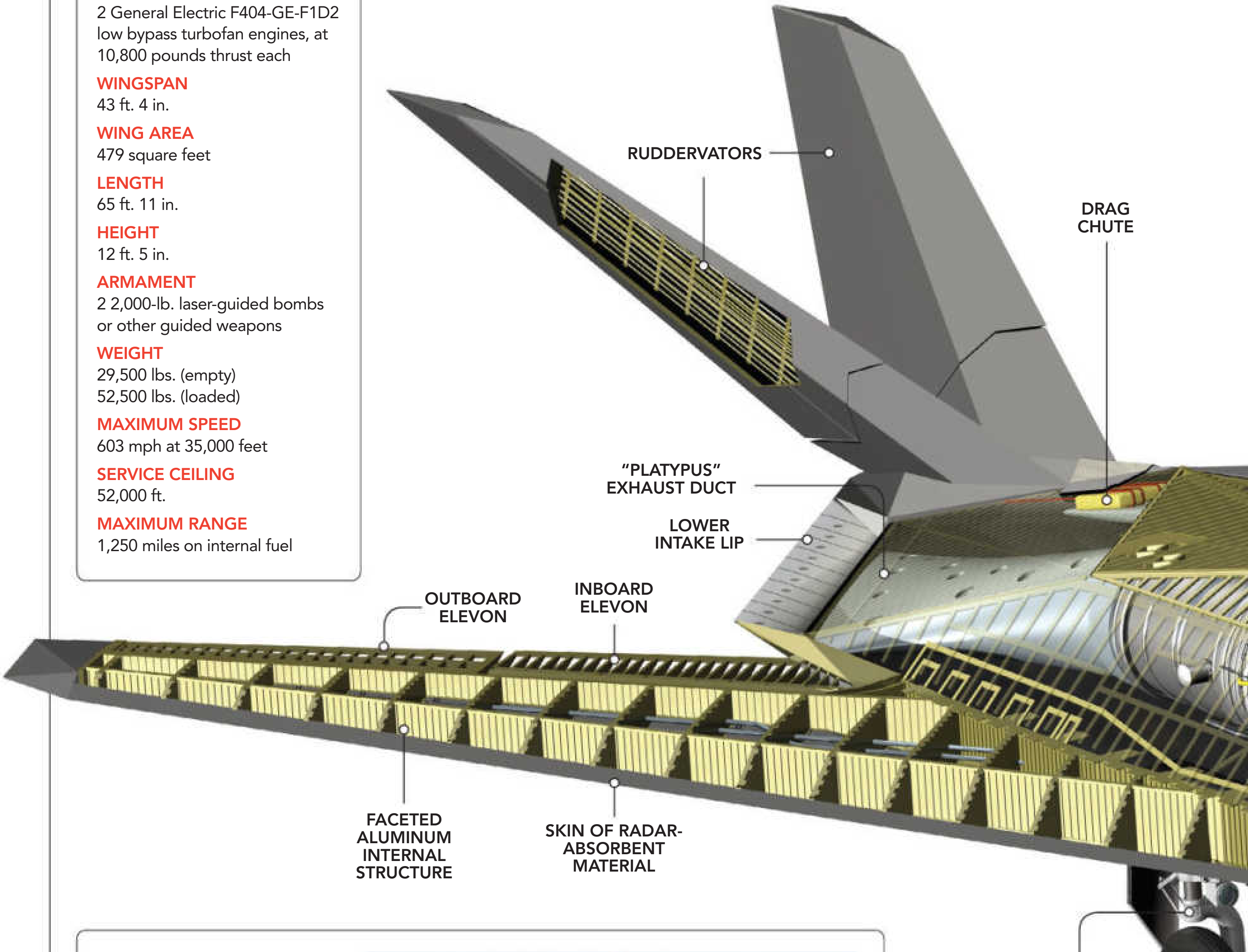
ARMAMENT
2 2,000-lb. laser-guided bombs or other guided weapons

WEIGHT
29,500 lbs. (empty)
52,500 lbs. (loaded)

MAXIMUM SPEED
603 mph at 35,000 feet

SERVICE CEILING
52,000 ft.

MAXIMUM RANGE
1,250 miles on internal fuel



THE OPPOSITION

The S-125 Neva/Pechora surface-to-air missile system was first deployed around Moscow in 1961, but from 1964 on was eclipsed by the improved S-125M and S-125M-1. Code-named "GA-3 Goa" by NATO, it consists of two to four two-stage rockets capable of hitting aircraft flying at lower altitudes, guided by three radar systems. The F-117 was specifically designed to foil missile systems such as these.

PARTY CRASHER

Debuting as part of the F-117's ordnance during Operation Desert Storm in 1991, the GBU-27 Paveway III is a laser-guided weapon with "bunker-busting" capability. The 2,000-pound guided bomb, which is 13 feet 10 inches long, can be precisely steered to its target within a range of 10 miles—despite the lack of a propulsion system.

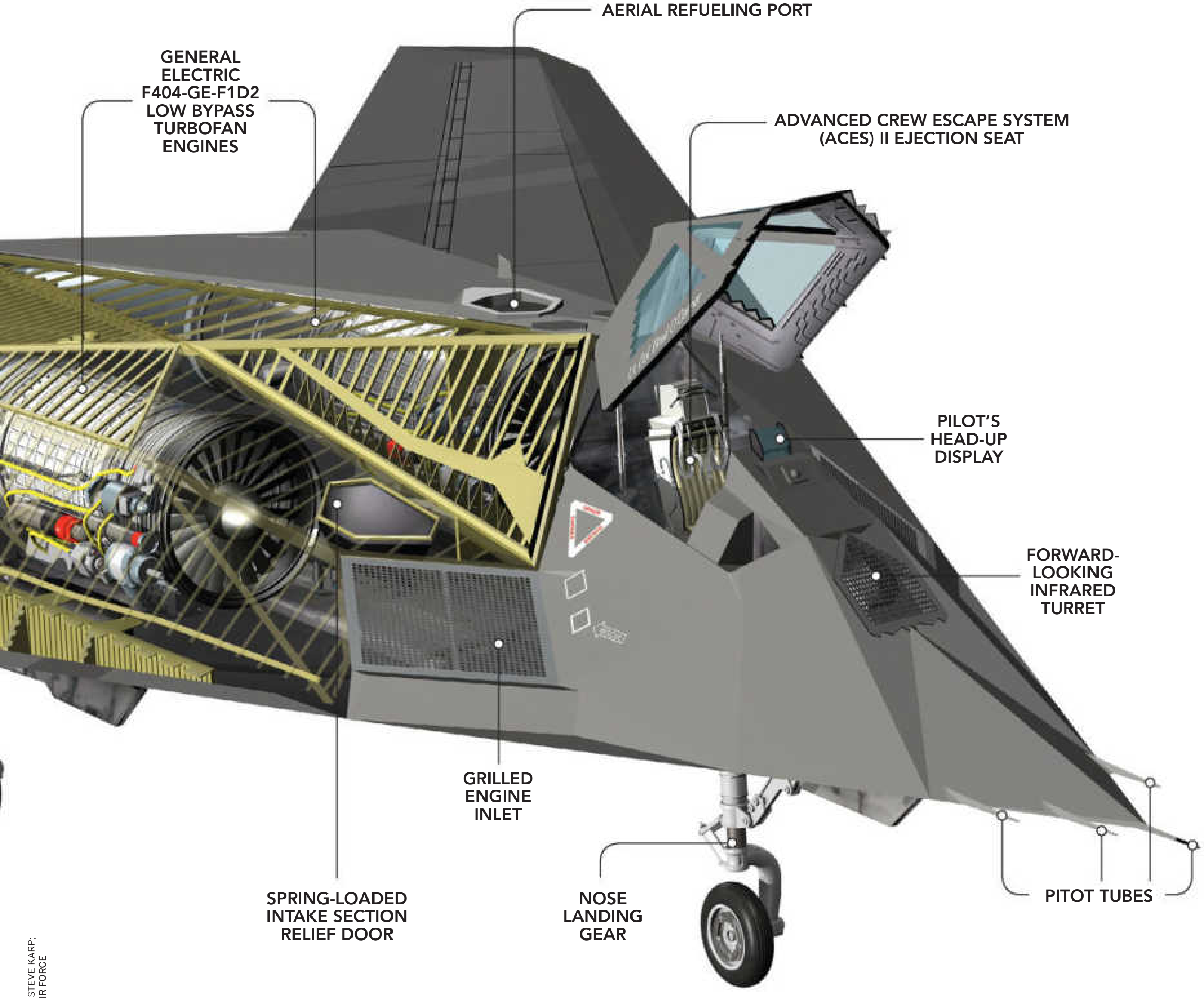
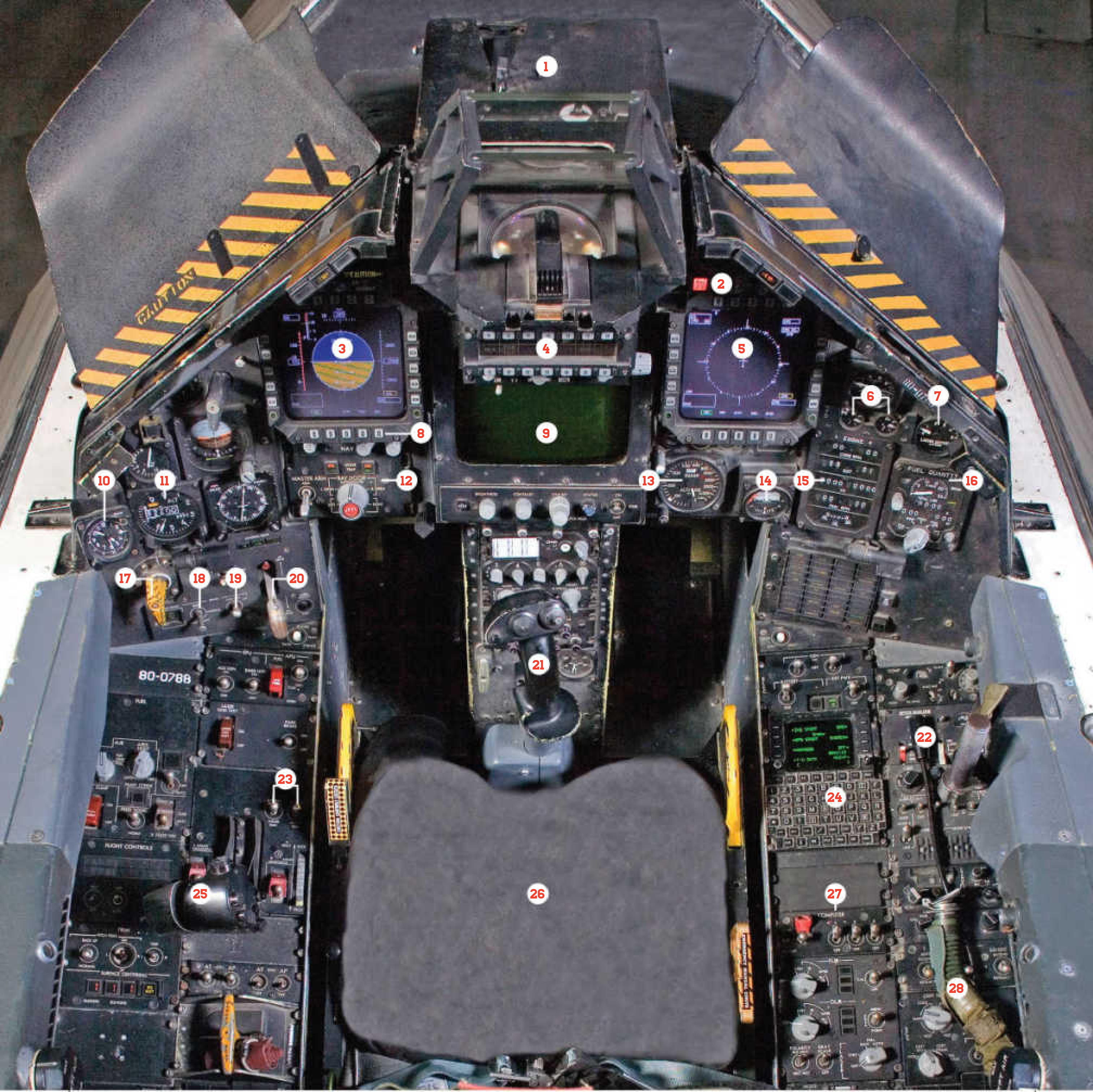

AERIAL REFUELING PORT
GENERAL ELECTRIC F404-GE-F1D2 LOW BYPASS TURBOFAN ENGINES
ADVANCED CREW ESCAPE SYSTEM (ACES) II EJECTION SEAT
PILOT'S HEAD-UP DISPLAY
FORWARD-LOOKING INFRARED TURRET
GRILLED ENGINE INLET
SPRING-LOADED INTAKE SECTION RELIEF DOOR
NOSE LANDING GEAR
PITOT TUBES

ILLUSTRATION: STEVE KARP; PHOTOS: U.S. AIR FORCE



LOCKHEED F-117A NIGHTHAWK COCKPIT

1. HUD (head-up display)
2. Dual FCS (flight control systems) light
3. Left multifunction display
4. Data entry panel
5. Right multifunction display
6. Flight pressure hydraulic indicator
7. Liquid oxygen indicator
8. Auxillary navigation panel
9. IRADS (infrared acquisition and detection system) sensor display
10. 24-hour clock
11. Altimeter
12. Armament control panel
13. Radar altitude indicator
14. Standby attitude indicator
15. Engine performance indicator
16. Fuel quantity indicator
17. Emergency gear T-handle
18. Brake system select switch
19. Brake anti-skid switch
20. Landing gear control handle
21. Control column (buttons, from left): Weapon release switch, trim switch, designate select switch
22. Oxygen regulator panel
23. Engine start panel
24. CDNU navigation interface
25. Throttle
26. ACES II ejection seat
27. Computer control panel
28. Oxygen hose

thus rendering it "invisible."

Using a process known as "faceting," Rich's team built a single-seat jet with no curved surfaces whatsoever. It emerged with hundreds of individual flat triangular and rectangular plates. The team further reduced the F-117's infrared signature with a slit-shaped tailpipe to minimize exhaust cross-sectional volume and maximize rapid mixing of hot exhaust with cool ambient air. Afterburners were eliminated because of the hot exhaust they created. The Nighthawk would be subsonic since breaking the sound barrier produced a sonic boom and heated up the aircraft skin, increasing its IR signature.

The oddly constructed "Hopeless Diamond" had neither the speed nor maneuverability of a fighter—which it was never intended to be. It was an attack bomber that emitted virtually no radar signature with landing gear retracted and bomb bay doors closed.

"No aircraft…that ugly could possibly be any good," Kelly Johnson commented, perhaps still dismayed because it didn't look more like a flying saucer.

Many other inglorious names were subsequently attached to the airplane: Roach, Wobbly Goblin, Stinkbug. Pilots simply called it the Black Jet.

Now over Kosovo, O'Connor flew one of only 64 Black Jets ever manufactured (including five test aircraft), as triple-A lashed across the night sky. He recalled Winston Churchill's comment about there being "nothing more exhilarating than to be shot at without result."

The F-117 could be preprogrammed to virtually fly itself onto a target. The stealth jet was inherently unstable, and required constant corrections from a fly-by-wire system to maintain controlled flight.

About three minutes out, O'Connor's aircraft made a preprogrammed climb that took him above all the AAA except the 57mm shells. At two minutes out, he focused on his target display showing the Baric munitions plant and ignored the pyrotechnics outside the cockpit. The flip of a switch placed the cursor on a mixing tower at the plant. Now concentrating on his bombing run, he tuned out urgent radio chatter in the background about surface-to-air missile activity and ignored the fact that he was well within SAM range.

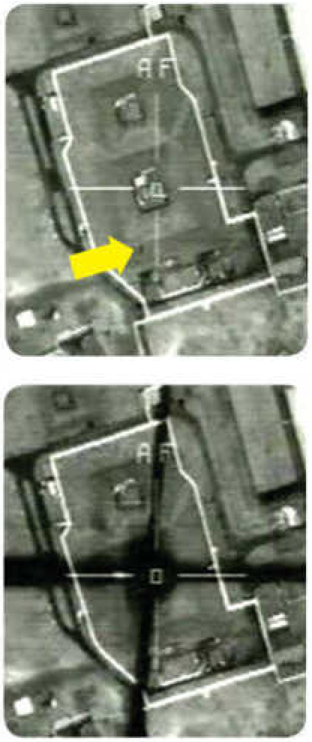
Aloud, he talked himself through the procedure. "Level attack, Record, Ready, Narrow, Cued, MPT [manual point tracking]."

He felt the bomb bay doors open and the 2,000-pound laser-guided bomb drop. Ten seconds later, his laser "auto-fire" symbol appeared. He counted down in unison with the computer the seconds until impact.

A tiny puff appeared on his target display, followed by shock waves that showed a direct hit. His Nighthawk then made a preprogrammed hard turn east toward Belgrade and his secondary target, the Novi Sad refinery northwest of the city. "What a hell of a way to make a living," O'Connor muttered to himself.

Later he learned from pilots in adjacent zones that a barrage of AAA had followed him through the turn and that several SAMs had been shot toward him, enemy radar having apparently glimpsed him when his bomb bay opened. Concentrating on his display screens coupled with a severely limited view outside the cockpit had kept him blissfully unaware of threats coming his way, but now he felt an adrenaline rush.

Churchill was right.



ON TARGET The arrow marks a guided bomb dropped by Lt. Col. Brad O'Connor's F-117, just before it destroys a mixing tower at the Baric munitions plant near Belgrade in April 1999.

Almost all the strategic military targets in Kosovo were destroyed by the third day of the campaign. Milošević's Serbs still refused to capitulate and continued assaulting the ethnic Albanians. NATO strikes turned to strategic targets such as bridges, government facilities, factories and industrial plants.

Two Americans died during the air campaign. Army Chief Warrant Officers David Gibbs and Kevin Reichert were killed when a technical malfunction caused their AH-64 helicopter to crash and explode during a night training mission over Albania.

The only Nighthawk ever lost in battle went down on March 27, 1999, as the result of a SAM fired from about eight miles away. Nighthawks were generally only visible to radar when their bomb bay doors opened to cast radar signatures. Lieutenant Colonel Dale Zelko bailed out of the stricken aircraft and was recovered by a U.S. Air Force rescue team.

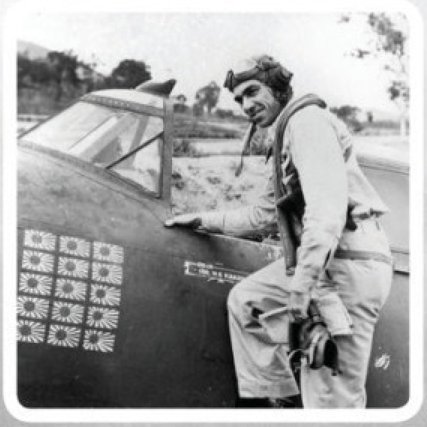
The air campaign ended on June 11, 1999, with the Kumanova Treaty. Milošević was eventually arrested by his own people and charged with crimes against humanity. He died in prison before his trial produced a verdict.

The F-117 fought once again when the long war against Iraq began in March 2003. The first U.S. warplane constructed entirely on top-secret stealth technology remained the most invisible and most deadly aircraft in the world until the Air Force retired it on April 22, 2008, replacing it with the F-22 Raptor and soon the F-35.

Lieutenant Colonel Brad O'Connor retired from active duty in 2007. He went from piloting the Black Jet to flying a C-47 Skytrain as a volunteer for the WWII Airborne Demonstration Team in Frederick, Okla. The plane he now flies, *Boogie Baby*, previously delivered paratroopers onto drop zones in Normandy on D-Day in 1944. ✢

Charles W. Sasser spent 29 years in active and reserve service with the U.S. Navy and Army Special Forces before retiring. He is the author of more than 60 books and some 3,500 magazine articles and short stories. Additional reading: Stealth Fighter: A Year in the Life of an F-117 Pilot, *by Lt. Col. William B. O'Connor (USAF, ret.).*

OPPOSITE: LOCKHEED MARTIN; RIGHT: COURTESY OF LT. COL. WILLIAM B. O'CONNOR (USAF, RET.)



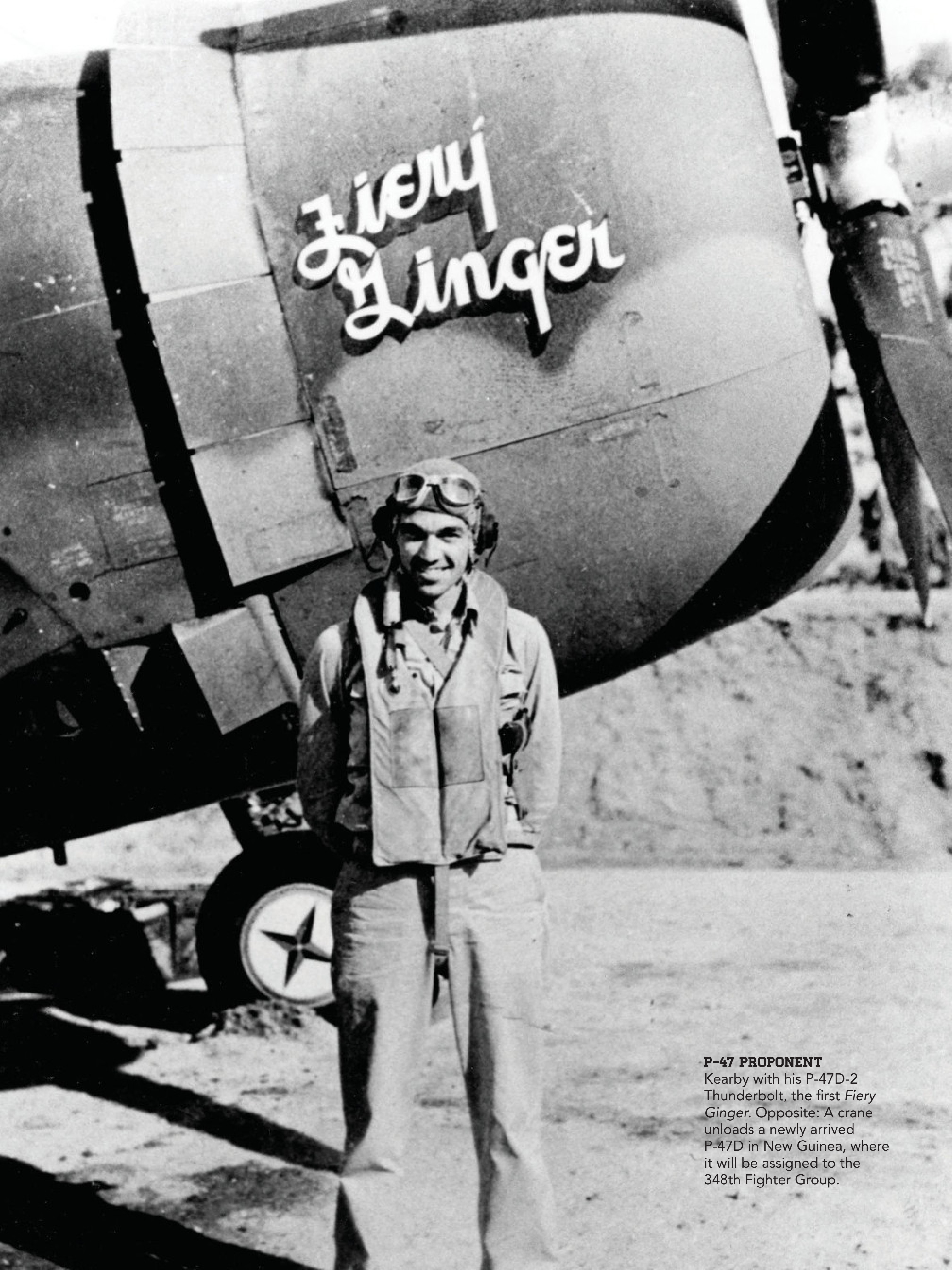
PACIFIC THUNDERBOLT ACE

COLONEL NEEL KEARBY WAS AMONG THE TOP SCORERS IN THE PACIFIC WHEN HE PUSHED HIS LUCK TOO FAR WHILE CHASING EDDIE RICKENBACKER'S RECORD

BY JOHN STANAWAY

SOMETHING TO PROVE
Lt. Col. Neel Kearby (far right) leads two flights of the 348th Fighter Group on a patrol from Port Moresby, New Guinea. Inset: Kearby, now with V Fighter Command, shows off his 15 victories as of December 3, 1943.

73
28145



P-47 PROPONENT
Kearby with his P-47D-2 Thunderbolt, the first *Fiery Ginger*. Opposite: A crane unloads a newly arrived P-47D in New Guinea, where it will be assigned to the 348th Fighter Group.

NEEL KEARBY ACHIEVED SOME REMARKABLE THINGS BEFORE HIS LAMENTABLY SHORT LIFE ENDED OVER NEW GUINEA IN MARCH 1944.

He became a U.S. Army Air Corps pilot in September 1940, and in 1941 was commanding officer of the 14th Pursuit Squadron in the Panama Canal Zone. By October 1942, he was a major in command of the 348th Fighter Group. Within the next 18 months he would take charge of the Fifth Air Force's V Fighter Command, be recognized as the top P-47 Thunderbolt pilot in the Pacific and earn the Medal of Honor.

Almost from the first time he took to a fighter cockpit, Kearby developed a reputation as a formidable dogfighter. His fame spread to the point that other young pilots sought him out to help sharpen their skills. One pilot pestered Kearby with such insistence that a series of mock combats was arranged for his benefit. The two men took off in Seversky P-35s—the sire of the Republic P-47 that would carry Kearby to glory. The practice encounter started on equal terms, but Kearby quickly gained the advantage behind his opponent. With every skill at his command the young pilot tried to evade his attacker, only to look around and find Kearby close enough to be seen calmly lighting a cigarette behind his windscreen!

The Seversky Company became Republic Aircraft and the P-47 started to come off the assembly lines in 1942. One of the first units to convert to the new type was the 348th Fighter Group, which was activated at the end of September. Major Kearby took charge of the unit in October 1942, and was quickly impressed by the 7-ton giant of a fighter.

The 348th was assigned to the Fifth Air Force in early 1943. Lieutenant General George Kenney, the dynamic leader of the Fifth in New Guinea, was determined to take the initiative in the Southwest Pacific. Although Allied military planners had decided to give priority to the European theater, Kenney prevailed on American decision-makers to send him enough equipment and manpower to mount offensive operations. The 348th was one of the concessions sent to his command.

There was a general consensus against the P-47 in the Pacific. Most commanders believed it was too heavy for combat with highly maneuverable Japanese fighters, and its limited range made it undesirable for the long-distance operations typical in the area. Kenney, however, was interested in building up his forces and knew that any equipment could be used to maximum capability. When he heard the 348th and its P-47s would arrive at Port Moresby sometime in June, he was reportedly so pleased that he said he would meet Kearby with a brass band. According to Kenney, when they finally did meet the first thing Lt. Col. Kearby asked was where he could find the nearest Japanese. The general promised imminent action and commented to his subordinates that the fighter leader looked like money in the bank.

Kearby studied the tactical situation while he honed the flying and organizational skills of his personnel to prepare them for combat. With effective support from an eager Fifth Air Force command, the group's P-47s were ready for action by the beginning of August.

Kearby's enthusiasm for the P-47 irritated some

ALL PHOTOS COURTESY OF JOHN STANAWAY UNLESS OTHERWISE NOTED; RIGHT: NATIONAL ARCHIVES

PACIFIC RIVALS Kearby and his men conduct a free fighter sweep in July 1943 (top left), while a 348th Group P-47 awaits its next mission in a revetment at Port Moresby (above). Kearby's chief rivals included Dick Bong (above right), with his weapon of choice, the P-38 Lightning.

P-38 Lightning devotees, who heatedly challenged him to a mock combat. Kearby accepted the challenge, and on August 1 met 16-victory P-38 ace Dick Bong in the skies over Port Moresby. Witnesses judged the contest according to their aircraft or pilot preference, but objective opinion seems to rate the duel a draw. Bong's flight log simply states that he met Kearby in a mock combat that lasted about 35 minutes.

The 348th's tactics centered on the P-47's high-altitude performance. Kearby stressed the ability of the large fighter to strike quickly from the heights to shred unwary Japanese formations with its eight .50-caliber guns. Flights were arranged to give the Americans every advantage in finding the enemy below before the Japanese were aware of their presence.

The 348th drew first blood during a transport escort mission to Marilinan on August 16. After the transports landed, about a dozen Nakajima Ki-43 "Oscars" attacked. With two bursts of fire, Lieutenant Thomas Barber sent one down into a wild spin. Captain Max Wiecks took on another Oscar in a head-on pass, and the enemy fighter fell in flames after the two planes narrowly avoided a collision. With the 348th's first two confirmed victories for no American losses, the P-47 was off to a good start in the theater.

Kearby himself would account for the next group victories. In his combat report for the September 4 bomber-interception mission along the Huon Peninsula, he recounted: "I was leading the fifth flight and when at 25,000 feet I observed one bomber with a fighter on each wing at a low altitude. After observing them for two or three minutes I decided to investigate. I hesitated because I hated to lose that precious altitude, and from the radio conversation there were flights all around."

When nobody else went after the Japanese bomber, Kearby released his external tank and dived on the enemy. "When at about 3000 feet I saw the red balls on the wings of the Oscars and [Mitsubishi G4M] Betty. I closed to 1500 feet and opened fire. I led the Betty and Oscar about one-half radii, hoping to get both of them, but was most interested in the Betty. Tracers were seen passing around the Oscar, and then, closing in, the Betty burst into flame."

Kearby's wingman Lieutenant George Orr, whose guns had jammed while he pursued the second Oscar, saw the enemy fighter that Kearby attacked dive into the water. It was a spectacular victory in which the fighter leader managed to attack two targets simultaneously for his first two kills.

Ten days later Kearby was leading eight P-47s on a top cover mission for transports bound for Malahang when he received a radar report of bogies in the area. He shot down a Mitsubishi Ki-46 "Dinah" twin-engine reconnaissance plane for his third confirmed victory. It would be the last tally for him until his most celebrated combat.

During this period of the New Guinea campaign, Lockheed's P-38 was establishing its reputation as the premier offensive fighter in the area. Its range and dominion over Japanese aircraft made it the weapon of choice for offensive operations, and it forced other Fifth Air Force fighters to take a back seat. Kearby was determined to change that situation, so he pressed every opportunity to place his P-47s in the center of battle.

One of the ways he sought to take advantage of the Thunderbolt's strengths was to commit it to the free fighter sweep. His first opportunity came on October 11, when he led four fighters over the teeming Japanese base at Wewak. Kearby's flight arrived over the area at 26,000 feet around 10:30 a.m. Forty-five minutes later he sighted a single enemy fighter (he reported it as a Zero, but it was almost certainly an Oscar) 1,500 feet below, and immediately attacked. Opening fire from about 200 yards, Kearby saw the Japanese fighter burst into flames. Then he zoomed back to 26,000 feet and searched for new prey. After 10 minutes, he saw about 36 Oscars and Kawasaki Ki-61 "Tonys" covering a dozen unidentified bombers along the coast at 10,000 feet. He led the flight down in a fast dive onto the tail of the enemy force.

Captain John Moore was flying on Kearby's wing and had seen the first Oscar go down in the water. Moore, the 341st Squadron operations officer, was glad to have the opportunity to go along on a promising mission as his commander's wingman. Within a few seconds he witnessed Kearby shoot down another Oscar and Captain Bill "Dinghy" Dunham, one of Kearby's close comrades from his days in Panama, flame a Tony that was trying to close on the flight leader's tail. With only a slight rudder adjustment, Kearby slipped in behind a third Oscar that took no evasive action before it also went down in flames. Yet another Oscar was above and quickly came into his sights, going down in full view of Dunham and Moore.

With the four P-47s' fuel running low, Moore remembered in his after-action report hearing Dunham and Major Raymond Gallagher call over the radio that they were turning for home. Moore also noted that he spotted Kearby in the midst of a flock of Japanese fighters. Diving to his leader's aid, Moore opened fire on a Tony and saw the fighter falling in flames until it passed from view under his wing, to become a probable victory.

Then reality set in for Moore. He saw another Tony fall to Kearby's fire before three enemy fighters came down on his own tail. The Tonys followed Moore in a dive until Kearby came to his rescue and shot down the third fighter in the string. Moore was happy to confirm Kearby's sixth kill for the day. The two Americans circled the area long enough to count the plumes of smoke emerging from the green foliage and blue sea. Kearby would be awarded the Medal of Honor in January 1944 for his bravery on that mission.

On October 16, 1943, the 348th escorted a group of B-25s to Alexishafen and downed a dozen enemy interceptors for no American losses. At the same time Kearby led a fighter sweep over Wewak and shot down an Oscar for his 10th confirmed kill.

Kearby led another P-47 sweep over the Wewak area on the 19th, during which a group of six Mitsubishi F1M2 "Pete" floatplanes was spotted taking off from an island. The little Japanese biplanes were in the worst possible situation, with white takeoff wakes still trailing behind when the Americans descended on them. All four P-47s destroyed one Pete each in the first pass, then turned for a second pass. Kearby sent another floatplane into the sea with a 90-degree deflection shot, while another P-47 pilot claimed the sixth Japanese aircraft.

Kearby now had 12 victories to his credit, all scored within six weeks. By this point in the war only two pilots in the Pacific theater, both flying P-38s, were ahead of him in number of victories: Dick Bong with 15 downed over nine months and Tommy McGuire with 13 in 10 weeks (though he had been shot down on October 17 after claiming three kills and would spend the next six weeks in a hospital). At that time Kearby was the fastest scoring American pilot of the war.

BY MID-OCTOBER 1943, KEARBY WAS THE FASTEST SCORING AMERICAN PILOT OF THE WAR.

On November 24, Kearby, by then a full colonel, became the leader of V Fighter Command, boosting his influence but also putting the brakes on his meteoric aerial scoring. At least he was now in a position to hasten the conversion of fighter units to the P-47. The worldwide shortage of P-38s became acute at the end of 1943, especially in the Southwest Pacific, which was a low priority on the supply chain and had just lost a number of Lightnings during the Rabaul campaign.

By January 1944, about half the fighters in V Fighter Command were P-47s, annoying many former P-38 pilots, who missed the range and other advantages of the Lockheed twin. Some pilots became accustomed to the P-47 and learned to appreciate its merits, but most continued to dislike the "Jug" and blamed Kearby for its proliferation.

By any measure, Kearby hated his job as head of the command. He still managed to claim seven victories before he took command of the 309th

ACES HIGH
Kearby relaxes with other 348th pilots at the Port Moresby officer's club.

OPPOSITE TOP RIGHT & BOTTOM: NATIONAL ARCHIVES

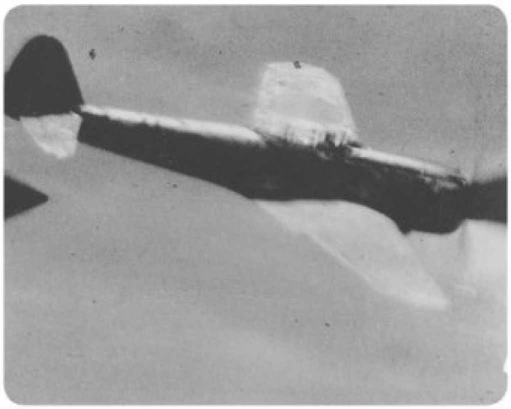
TRIPLE ACE PLUS Kearby scored kills on December 22 and 23, 1943, raising his tally to 17. His main opponent, the Ki-43 "Oscar" (below), was nimble but inferior to the Thunderbolt in most respects.

Bomb Wing on February 26. This new assignment at least gave him more opportunities to fly missions with his beloved 348th Fighter Group. Meanwhile Bong had raised the scoring bar in November 1943, becoming the first U.S. Army pilot to attain his 20th victory. Now the goal was to surpass Captain Eddie Rickenbacker's legendary World War I record of 26 air victories.

Bong and Lt. Col. Thomas Lynch had been taken out of combat at the end of 1943, but had returned to the theater during the first months of 1944 to fly free sweeps together while attached to V Fighter Command. Bong was still the ranking ace, with 21 victories, while Lynch returned with 16.

Kearby, now with 19 victories, kept the contest tight when he led yet another four-plane P-47 sweep over Wewak on January 9. Attacking a group of 18 Tonys head-on directly over the harbor, he sent one down with smoke trailing behind. He caught another a few miles out to sea, and watched it fall in flames into the water for his 21st victory.

The race of aces heated up in March, when Bong scored his 22nd victory and Lynch his 20th. Kearby felt increased pressure to win the competition, but there was a dark side to the race to beat Rickenbacker. Marine Corps Captain Joe Foss had equaled the record as early as January 1943, but he was shot down and nearly killed in the process. A fellow Marine, Major Gregory "Pappy" Boyington, was also shot down and captured in his bid to break Rickenbacker's record. Another Marine pilot, Captain Robert Hanson, was killed just as he reached the 25-victory mark. Lynch would be killed on March 8 while chasing the record with Bong. Whether they realized it or not, all the aces were tossing prudence to the wind for the honor of becoming the first American to attain 27 victories.



On March 5, Kearby took off in the afternoon to fly a sweep over the Tadji area with his old comrade, Captain Dunham, and another 348th ace, Captain Sam Blair. The three P-47s left the newly won airfield at Saidor, just north of the Huon Gulf, at 4 o'clock and were in the combat area an hour later.

Kearby was the first to sight a Ki-61 Tony flying below about 500 feet over the airstrip at Dagua. Since the Americans were at an altitude of 23,000 feet, the enemy fighter was allowed to land safely. Height was critical, so Kearby kept his fighters in an advantageous position. Not more than five minutes later the Americans observed three Japanese bombers coming in from the sea at about 500 feet. From their high vantage point the Americans thought they were Mitsubishi G3M "Nell" twin-engine aircraft, but postwar review of Japanese records suggests they were in fact Kawasaki Ki-48 "Lilys," which had arrived from the Hollandia area at about that time.

This time Kearby ordered tanks dropped and led the three P-47s down in a fast dive on the enemy. Captain Blair, on the right, watched as the Japanese planes circled the airstrip, almost certainly in preparation for landing. Blair saw Dunham attack the bomber at left, and it burst into flames and crashed.

When the range was down to about 200 yards, Blair concentrated his fire on the right-hand bomber. He flashed over the target at a very high speed, then looked back and saw it crash into the ground. In the same moment he also saw Dunham make an ineffective pass at the center target, which had escaped Kearby's usually flawless aim.

Dunham broke to the left to come full around heading in the opposite direction. He could see that all three bombers had gone down in the jungle and that Kearby was clawing for altitude. Kearby had evidently made a complete circle to attack and destroy the third Japanese bomber, and was now flying much too low and slow to evade an Oscar that was closing into firing range. The Oscar pilot, probably from the nearby 77th *Sentai*, was

LASTING LEGACY
After Kearby's death, the 348th upheld his aggressive tradition in the Pacific.

apparently intent on exacting revenge for the loss of his three comrades. Dunham frantically dived in a head-on attack and watched his tracers hit the enemy fighter even as the Oscar sent a burst into Kearby's cockpit and engine.

Meanwhile Blair had recovered to the right above the scene of the fight and saw Dunham climb after his attack on the Oscar. Four columns of smoke now marked the demise of the Japanese aircraft. Kearby was nowhere to be seen.

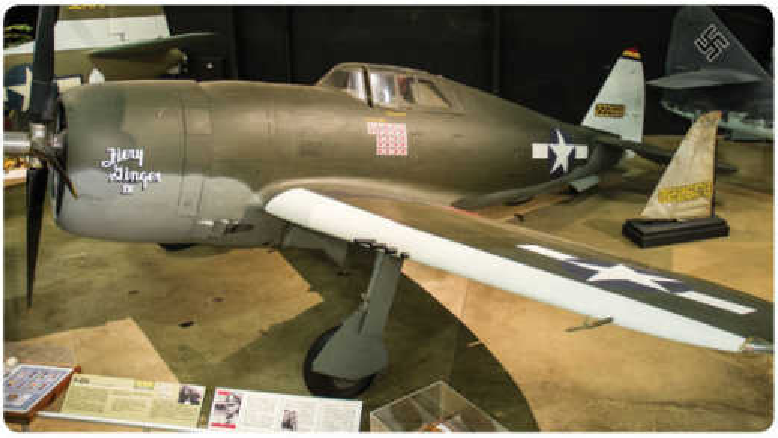
After searching the area, Dunham and Blair flew back to land at Saidor around 6:30. They tried to call Kearby several times during the flight back, in the vain hope that he was able to navigate his crippled fighter home. Dunham was so beside himself with grief that he had to be restrained from taking off on a search mission in the gathering dark. When no word was received from other stations into the night, it was obvious that the indomitable Kearby had to be listed as missing in action.

Neel Kearby fell into the cracks of history when he was officially listed as killed in action at war's end. His tally of 22 confirmed victories was the highest for a P-47 pilot in the Pacific, and he was one of only two Thunderbolt pilots to receive the Medal of Honor in WWII. His body, found about 140 miles from Wewak, where he had parachuted into the jungle and subsequently died from his wounds, was recovered by a Royal Australian Air Force search team after the war and returned to his home state of Texas for a quiet funeral in 1949.

Dick Bong finally broke Rickenbacker's record on April 12 when he claimed three Oscars over Hollandia. He became America's ace of aces with 40 victories, but was killed while testing a Lockheed P-80 jet fighter on August 6, 1945.

One final note relates to the wreckage of the P-47 Kearby flew on his last mission. In 2001 the remaining pieces of tail and other recognizable parts were transported out of the crash site. Those artifacts were donated to the National Museum of the U.S. Air Force in Dayton, Ohio, in 2003, and can now be viewed next to a smartly decorated P-47D painted in Colonel Kearby's colors. ✢

John Stanaway is the author of Kearby's Thunderbolts: The 348th Fighter Group in World War II *and* Mustang and Thunderbolt Aces of the Pacific and CBI, *which are recommended for further reading.*



IN MEMORIUM
Fiery Ginger IV's recovered vertical stabilizer is displayed next to a P-47D bearing its full livery at the National Museum of the U.S. Air Force.

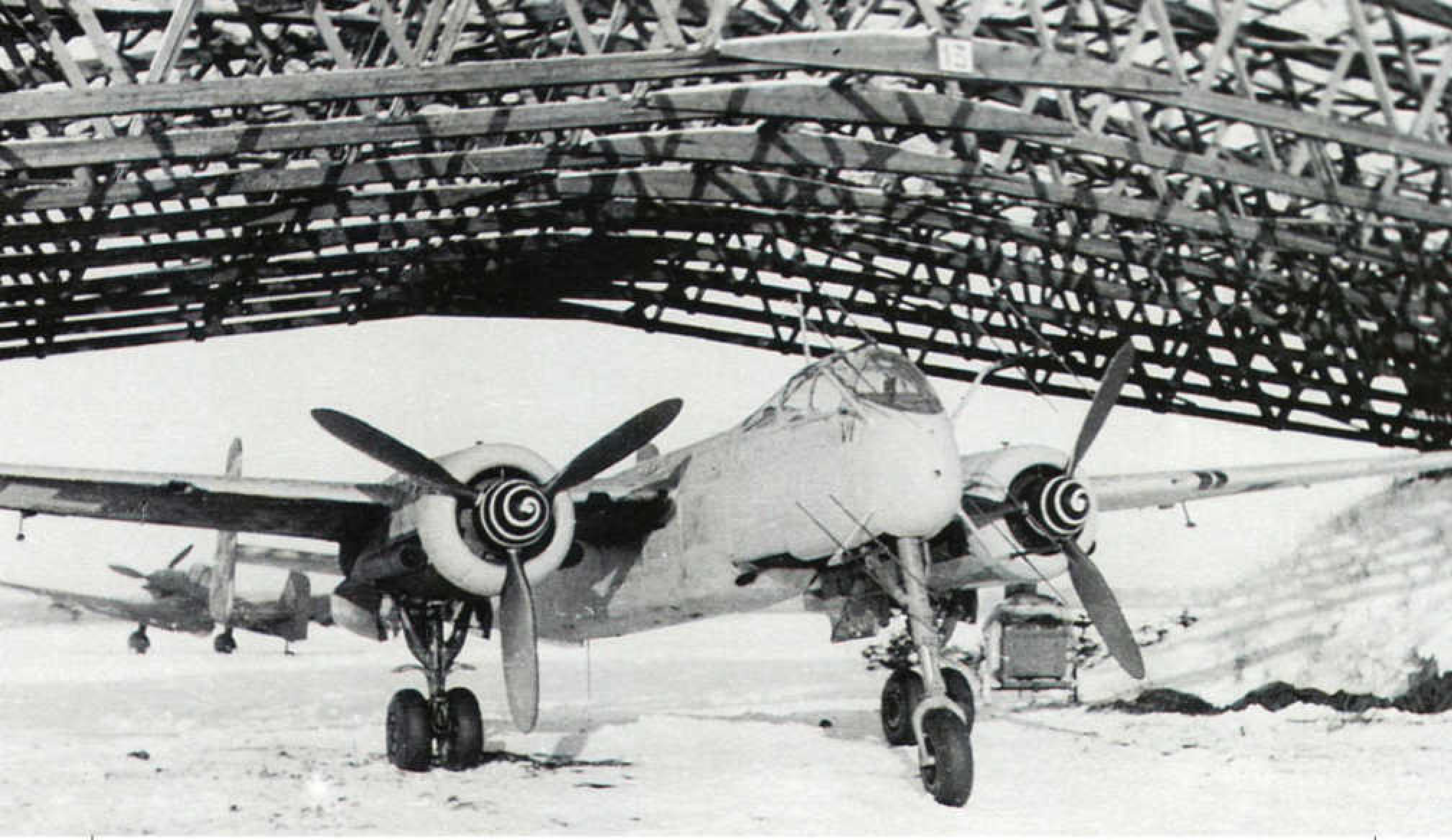
OPPOSITE TOP: MYRON DAVIS/THE LIFE PICTURE COLLECTION/GETTY IMAGES; OPPOSITE BOTTOM: NATIONAL ARCHIVES; RIGHT: NATIONAL MUSEUM OF THE U.S. AIR FORCE

NIGHT OWL

HEINKEL PRODUCED ONE OF THE MOST INNOVATIVE NIGHT FIGHTERS OF WORLD WAR II, BUT **NAZI BUREAUCRATS REPEATEDLY SHOT IT DOWN**

BY STEPHAN WILKINSON

NOCTURNAL PREDATOR
An He-219 bristling with radar antennas finds a victim—an Avro Lancaster—in the night skies over Germany, in Mark Postlethwaite's illustration.



OWL BY DAY
An He-219A of I *Gruppe*, NJG.1, shelters at Munster Handorf air base during the winter of 1944-45.

THERE WERE MANY NIGHT FIGHTERS IN WORLD WAR II, BUT ONLY TWO WERE DESIGNED FROM THE GROUND UP TO PLAY IN THE DARK: THE NORTHROP P-61 BLACK WIDOW AND THE RADAR-LADEN HEINKEL HE-219.

The rest were modifications of fighters and light bombers originally intended for daylight battle, and the results ranged from superb—particularly the Messerschmitt Me-110G and several versions of the de Havilland Mosquito—to nearly useless.

The He-219 was neither superb nor useless, but, as the fifth grader's report card reads, it did not work up to its potential. It was a classic underachiever.

The hardest battles the He-219 fought were political. The airplane was repeatedly canceled by the German air ministry (*Reichsluftfahrtministerium*, or RLM) and then surreptitiously ordered back into production by its enthusiasts in the Luftwaffe. The controversy over the Uhu—unofficially named after a large Eurasian horned owl—had ministers, manufacturers and military men all fighting like tomcats in a flour sack. By the time these fools were fired, transferred, dead or otherwise disposed of, fewer than 300 He-219s had been manufactured. Nobody knows the exact number—288 is a frequently published guess—since record-keeping was not a Nazi priority as the war wound down.

The He-219's most intractable opponent was Erhard Milch, the field marshal in charge of German aircraft production. Besides intensely disliking the dislikable Ernst Heinkel, Milch wanted to rely upon night fighters based on existing designs—especially the Junkers Ju-188, an uprated version of the simple, versatile and proven Ju-88. Quantity trumped quality, Milch believed. Better to have hordes of good night fighters rather than a few great ones.

Designed in 1940 and first flown in 1942, the Uhu entered combat in June 1943. The airplane was all done, literally out of gas and with too few trained crews to fly it, a year and a half later, well before the war in Europe ended in May 1945. The last He-219 victory was notched on March 7 of that year.

If thousands of He-219s had been built, would they have changed the war? At worst, they could have forced the RAF to join the Americans in day bombing, which might not have been bad thing. In a May 1945 interview with Lt. Gen. Carl Spaatz, Luftwaffe leader Hermann Göring admitted that U.S. Army Air Forces daylight raids were far

PREVIOUS PAGES: ©MARK POSTLETHWAITE; ABOVE: NATIONAL ARCHIVES;
OPPOSITE: IMPERIAL WAR MUSEUM (TOP) C 3371, (BOTTOM) CE 121

more effective than the RAF's night area bombing. "The precision bombing was decisive," Göring said. "Destroyed cities could be evacuated, but destroyed industry was difficult to replace."

Some say the Uhu could have been the best night fighter over Europe. Others, particularly Eric "Winkle" Brown, the late, great Royal Navy test pilot who flew several He-219s after the war, thought it was overrated. The Uhu, he wrote, "had perhaps the nastiest characteristic that any twin-engine aircraft can have—it was underpowered. This defect makes takeoff a critical maneuver in the event of an engine failing, and a landing with one engine out can be equally critical. There certainly can be no overshoot [go-around] with the He-219 in that condition."

Still, the He-219 had several strengths. With three fuselage fuel tanks the size of dumpsters, it was able to loiter for four or five hours to wait for ground radar to find it targets, while other Luftwaffe night fighters typically had to go home after 90 minutes or so. Its cockpit was superbly laid out and roomy in an era when pilots typically worked amid unplanned jumbles of controls, switches and instruments. At one point, it was suggested that the He-219's entire bolt-on, two-seat cockpit unit be grafted onto the Ju-188. The He-219's ordnance was overpowering—a maximum of two cannons in the wing roots, four more in a belly tray under and behind the cockpit and yet another pair in an upward-angled *Schräge Musik* installation amidships.

(It has become aviation lore that *Schräge Musik* means "jazz music," but that is a canard that has taken on a life of its own among amateur Luftwaffe historians. Translated literally, *Schräge Musik* means "slanted music," which makes perfect sense, since the gun barrels are slanted, and we can accept the concept of gunfire being "music." Native German speakers affirm that the term *Schräge Musik* was never applied to jazz.)

The guns were not only overpowering but overkill. One or two well-aimed rounds from a 30mm cannon would almost certainly be enough to bring down a bomber, and six simply sealed the deal. Many crews removed all but two of the heavy belly-tray and wing-root guns, and some sources say that not a single He-219 in I *Gruppe* of *Nachtjagdgeschwader* 1 (I/NJG.1)—the sole air group to be fully equipped with Uhus—carried a *Schräge Musik* mount.

Many a metaphor has been expended to describe the appearance of the Uhu. Its long, skinny fuselage is flanked by lengthy engine nacelles atop stalky landing gear, and its most distinctive feature is a reptilian canopy that uncannily resembles—allow me another overripe metaphor—the carapace of the slavering, thorax-slashing monster in the film *Alien*.

VULNERABLE TARGETS Flares silhouette a Lancaster over Hamburg (above) in 1943. Shredded by a night fighter on a mission to Berlin, this Lanc (below) somehow limped back to Sussex.

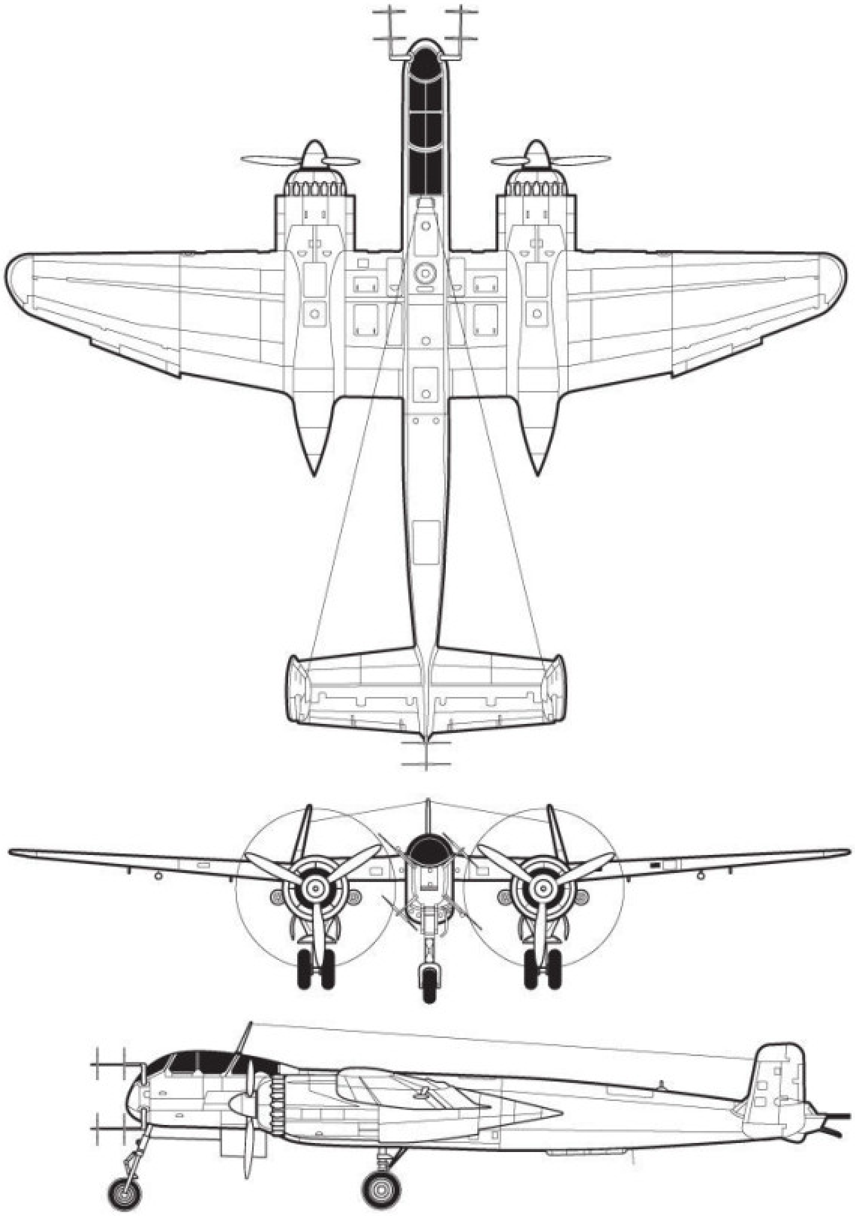
SOME SAY THE UHU COULD HAVE BEEN THE BEST NIGHT FIGHTER OVER EUROPE. OTHERS THOUGHT IT WAS OVERRATED.

German designers were good at reducing cooling drag for engines that required radiators, and rather than slinging the big brass heat exchangers under the wings or in a bluff chin configuration, they chose annular radiators—interconnected coolers arrayed in a circle around the front of the engine. This had two advantages: efficient cooling, and since a liquid-cooled engine's Achilles' heel is its vulnerable plumbing, the ability to concentrate all the engine's pipes, hoses and tubing within a compact, easily armored area—no long runs to wing- or belly-mounted radiators.

Those round nacelles provide ample reason to assume the He-219 was powered by radial engines, but in fact they were Daimler-Benz DB 603 inverted V12s. Supposedly supertuned to put out 3,000 horsepower, the 603 was originally mounted in the six-wheel, Ferdinand Porsche–designed Mercedes-Benz T80 land speed record car. At 44.5 liters—65 percent larger than a Rolls-Royce Merlin—it was by far the largest V12 the Luftwaffe ever flew.

The He-219 was designed to use the 1,875-hp DB 603G, but that never made it into production, underscoring the dangers of combining an unproven engine with a brand-new airframe. Because

TECH NOTES HEINKEL HE-219A-7/R1



SPECIFICATIONS

WINGSPAN
60 ft. 8 in.

WING AREA
478 square feet

LENGTH
50 ft. 11¾ in.

HEIGHT
13 ft. 5½ in.

ARMAMENT
Two 30mm MK 108 cannons in wing roots, two 30mm MK 103 and two 20mm MK 151 cannons in ventral tray, plus two 30mm MK 108 cannons firing obliquely upward

WEIGHT
24,692 lbs. (empty)
33,730 lbs. (loaded)

ENGINE
2 Daimler-Benz DB 603E 12-cylinder inverted-V liquid-cooled engines with 1,775 hp each

MAXIMUM SPEED
416 mph at 22,965 feet

NORMAL CRUISING SPEED
335 mph

SERVICE CEILING
41,660 feet

RATE OF CLIMB
1,810 feet per minute

RANGE AT CRUISING SPEED
1,243 miles

the He-219 had to fly with less powerful versions of the 603, its rate of climb and speed never met predicted numbers. The fact it was lumbered with a ton of cannons and every piece of air-intercept electronics the Germans could cram into it didn't help. The *empty* weight of a typical He-219 was greater than the weight of a fully fueled, ammoed and crewed Mosquito.

Nor did the nose-mounted array of high-drag external radar antennas, called stag's antlers, help. They slowed the airplane noticeably, and not until early 1945 did the Germans come up with a cavity magnetron dished radar that could be mounted inside a radome like U.S. units. By then, it was irrelevant.

Robert Lusser had originally worked as a designer for Heinkel but moved in 1933 to Bayerische Flugzeugwerke, where he and Willi Messerschmitt laid out the Bf-109 fighter. In 1938 Lusser returned to Heinkel and designed the He-280, the world's first jet fighter, though it lost out in production to the Me-262. Lusser also began laying out the airplane that would, through several twists and turns, ultimately cost him his job: the He-219. (When the RLM twice rejected Lusser's initial He-219 proposals, Ernst Heinkel fired him. Lusser went on to Fieseler, where he refined the design of the V-1 buzz bomb, and in the early 1960s made a small fortune by designing the world's first modern quick-release ski binding.)

Heinkel had already built a high-speed reconnaissance/bomber prototype, the He-119. In a sense, the 119 was the predecessor of the 219, despite the fact that its DB 606 power plant—actually two coupled DB 601 in-

KATAPULTSITZEN
A German pilot prepares to test the Uhu's ejection seat.

verted V-12s—was buried behind the cockpit and drove contra-rotating props on its nose. The entire fuselage was cleanly cigar-shaped, and the pressurized cockpit was the fully glazed tip of the cigar, with the prop shaft running at biceps height between the two pilots.

Lusser took a new cut at the concept and came up with a tricycle-gear twin that also had a pressurized cockpit and ejection seats, plus remotely controlled defensive armament of the sort that would later appear on the Boeing B-29. Many published sources say the He-219's nosewheel was steerable, which would have been another notable innovation. But the Uhu's nosegear was in fact free-castering, swiveling only in response to differential power or braking.

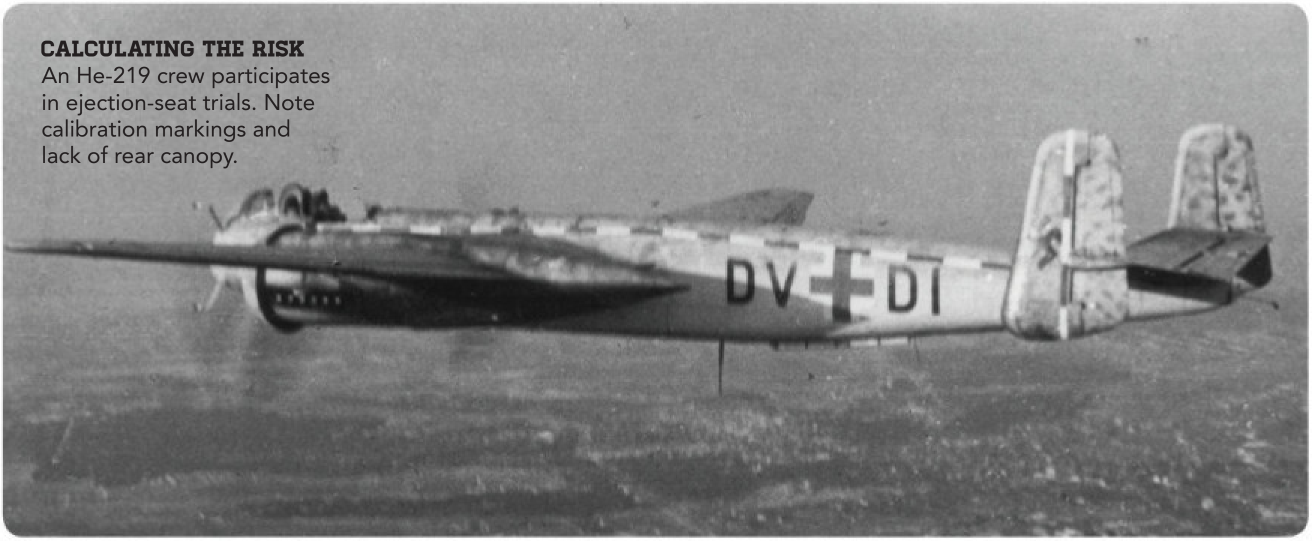
The ejection seat, however, was another matter. It was a major advance that predated anything of the sort in Allied aircraft, even though the British Martin-Baker company would go on after the war to set the standard for fast-jet ejection seats. The Germans and the Swedes had been working in parallel on ejection-seat design. Both Saab and Dornier were designing fighters with pusher props—the J21 and the Do-335—that would Cuisinart a pilot making a conventional bailout, and Heinkel had the He-280 jet in the works. The need for assisted bailout was becoming increasingly apparent; in the case of the He-219, the crew sat well ahead of the propellers, and since the reliability of Heinkel's *Katapultsitzen* was questionable, those big props would remain a fearsome obstacle throughout the airplane's brief career.

Junkers had pioneered ejection seats with a late-1930s patent for a "bungee-assisted escape device" that fortunately never went beyond the patent application paperwork. Saab accomplished the first-ever in-flight ejection, though with a dummy in a cartridge-fired seat, in January 1942. Less than a week later, a German test pilot did it for real, punching out of an He-280 prototype after encountering icing in a snowstorm. In April 1944, an He-219 pilot and radar operator ejected during an attack by a Mosquito—the first-ever combat ejection. Ernst Heinkel awarded each of them 1,000 Reichsmarks (equivalent to about $1,300 today) for their troubles. Another He-219 pilot ejected three times, his back-seater twice—unfortunately too late for the Heinkel bonus.

IN APRIL 1944, AN HE-219 PILOT AND RADAR OPERATOR EJECTED DURING AN ATTACK BY A MOSQUITO—THE FIRST-EVER COMBAT EJECTION.

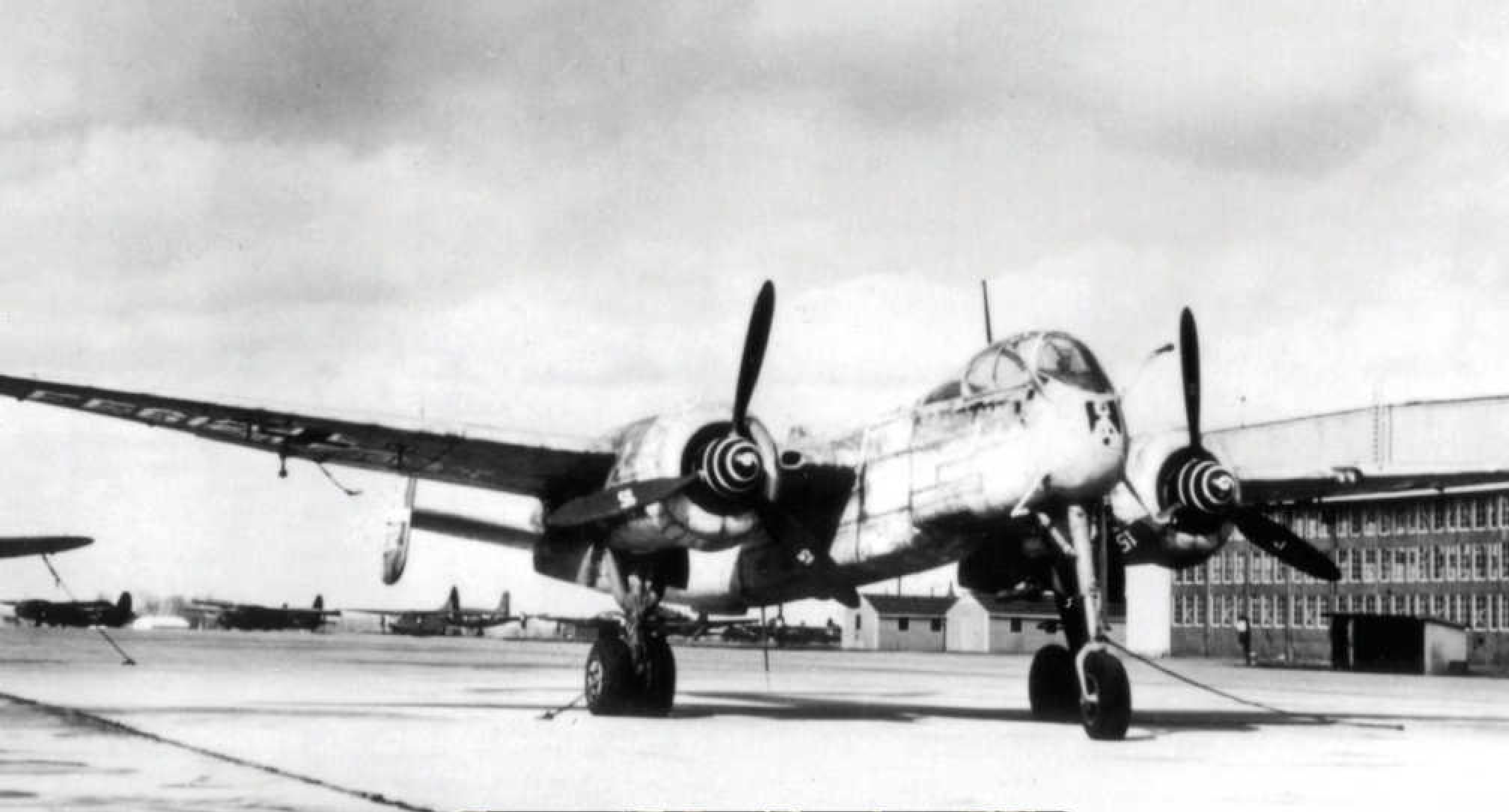
Heinkel's ejection seat was operated not by an explosive charge, like Saab's, but by compressed air stored in an array of grapefruit-size spherical tanks for each seat. The system was vulnerable to leakage and, of course, battle damage to the pneumatics. About half the crew departures from He-219s were conventional jumps due to inoperable ejection seats.

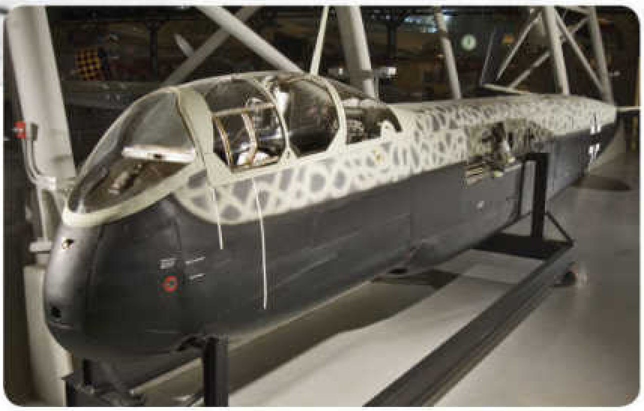
The He-219's entry into combat was the stuff of legend. Only one Luftwaffe night-fighter group, I/NJG.1, had been apportioned nearly all the existing He-219s, many of them still production prototypes. On the night of June 11-12, 1943, the outfit attacked a huge stream of RAF bombers headed toward Düsseldorf. In an hour and a quarter—



CALCULATING THE RISK
An He-219 crew participates in ejection-seat trials. Note calibration markings and lack of rear canopy.

ILLUSTRATION: STEVE KARP; PHOTOS: COURTESY OF WOLFGANG MUEHLBAUER





SURVIVING EXAMPLE
An Uhu awaits assessment at Freeman Field in Indiana (above) after the war. The National Air and Space Museum is currently in the final stages of restoring that same He-219 for display at its Udvar-Hazy Center (right). A cockpit view (opposite) reveals the oddly shaped control yoke and sensible instrument layout.

some sources say 30 minutes—a single Uhu crew shot down five of the big bombers and headed for home only because they had expended all their ammunition. (Karma's a bitch: Pilot Major Werner Streib, I/NJG.1's commander, crashed hard on landing when his flaps blew back up, and though he and his radioman survived with minor injuries, the Uhu became the sixth victim of that engagement.)

Legend indeed: One common He-219 myth holds that during the following 10 days, Uhus shot down 20 more British bombers, including six of the formerly untouchable Mosquitos. There is no evidence that anything of the sort took place. Not a single Mosquito was beaten by an He-219 during all of 1943, and the Uhu didn't down its first Mossie until May 1944. By the end of the war, more He-219s had been shot down by Mosquitos than the reverse.

The RLM had rejected Robert Lusser's original He-219 concept because of its complexity—pressurization, ejection seats, remote-control gun barbettes, tricycle landing gear, manufacturing challenges, untried engines. Heinkel set out to simplify and rationalize the Uhu, and the design was finally put into limited production. But Heinkel never stopped tinkering with the airplane. Rather than concentrating on one or two variants and building them in meaningful numbers, the company kept trying a variety of engines, crew configurations and armament setups. Though end-of-war confusion makes it difficult to establish a firm number, there may have been as many as 20 variants of the He-219 with 29 different gun setups.

Air forces hate single-mission aircraft like the He-219. They want airplanes that can drop bombs, strafe, dogfight, do reconnaissance, carry torpedoes and fly close air support. The He-219 could do nothing but fly at night to shoot down large, slow bombers. During the day, it was itself large and slow. This made it difficult to train new Uhu crews, since the basics of such training had to be done in daylight in a combat zone.

A fast-bomber version of the He-219 was proposed, as was a long-wing, high-altitude reconnaissance model. Heinkel planned to build a jet-powered He-219, and tested a BMW 003 turbojet in a pod under the belly.

And always the phantasm of a Mosquito-beater was pursued. Heinkel lightened the He-219, limited fuel, deleted guns and added power to achieve a book speed of 400 mph, but that airplane was never produced. In the real world, the best the He-219 could achieve was parity with some of the de Havillands. The supreme Mosquito Mark 30 night fighter, however, could shoot down the Heinkel at will. The RLM even briefly pursued a project called the Hütter Hu-211, which would have created a U-2-like He-219 using the Uhu's main structure and engines with high-aspect-ratio wooden wings and a V tail built by sailplane specialist Hütter. It was to fly high and fast enough to evade Mosquitos, but the prototype was destroyed during an air raid.

Keeping complex He-219s operable became increasingly problematic as the war progressed. One Uhu pilot wrote: "It was rare that more than 10 machines took off on a night mission, usually less, and of those half either returned immediately after takeoff or were forced to land within the next half hour on account of malfunctions or problems. In the majority of cases, it was onboard electrics that failed."

The airplanes were frequently parked outdoors and suffered condensation and water leaks. Those Uhus were flown every two or three days to air them out. Thanks to damp electrics, one He-219 pilot found himself in perfect firing position behind an RAF bomber, but when he pressed the trigger button, his landing lights came on. He admitted that it was hard to say who was more frightened—attacker or target.

When Germany surrendered in May 1945, few Uhus remained. The RAF ferried five of eight flyable He-219s from a night-fighter base in Denmark to England and sent the remaining three to Cherbourg, where they and a number of other Luftwaffe aircraft were loaded aboard a British escort carrier and shipped to Newark, N.J., then flown or trucked to Freeman and Wright fields, in Indiana and Ohio. At Freeman Field, one of the Uhus was reassembled and test-flown for 14.7 hours—the last time a Heinkel He-219 would ever fly.

One unusual piece of He-219 technology that intrigued the Army Air Forces testers and has thus survived is the "ribbon parachute" used to slow and stabilize the ejection seat after it was fired. Ribbon-and-ring chutes based on that German design have since been used to brake everything from top-fuel dragsters to space capsules.

Of the three Uhus that came to the U.S., one was scrapped at Chicago's Orchard Place Airport (today O'Hare). Another simply disappeared, doubtless scrapped elsewhere. The Freeman flyer, however, still exists. It is today in the final stages of a complete static restoration at the National Air and Space Museum's Udvar-Hazy Center at Dulles Airport. European Aviation Curator Evelyn Crellin points out that it is actually something of a composite, having been reassembled at Freeman Field with engines and vertical stabilizers from the other two Uhus.

OPPOSITE: (TOP) NATIONAL ARCHIVES, (BOTTOM) NATIONAL AIR AND SPACE MUSEUM; RIGHT: NATIONAL ARCHIVES

THE HE-219 COULD DO NOTHING BUT FLY AT NIGHT TO SHOOT DOWN LARGE, SLOW BOMBERS. DURING THE DAY IT WAS ITSELF LARGE AND SLOW.

Crellin can't give a firm date for the completion of the restoration, for the last major task remaining is rejoining the fuselage and the huge, one-piece wing. If it can be done inside the Udvar-Hazy museum building, where the wing and fuselage are currently displayed along with the two restored DB 603 engines, it might happen as soon as this summer. If the components have to be reunited in the museum workshop, the job will take substantially longer.

Even then, there will be one task left: replication of the stag's horn FuG 220 radar dipoles and mast, which disappeared long ago. Though Smithsonian restorers could easily mock them up from lengths of tubing and fabricated pieces based on old photographs, they insist on creating functional replicas of the original units, and all that is known about them is that they were made of steel, aluminum and wood. No records of their actual construction have yet been found, though one original antenna array exists in a museum in Europe, which the Smithsonian will borrow and reverse-engineer.

Another example of the workshop's insistence on authenticity is that during restoration, removal of the Uhu's wing-root fillets exposed the original wave-pattern camouflage paint still in perfect condition. It has been left untouched so that future researchers and historians will be able to examine it. When the fillets are screwed back in place, museum visitors will never see that there are areas of the airplane that remain unrestored.

The Smithsonian airplane is an apt example of the He-219's unproductiveness. It was built in July 1944 and flew exactly 3½ hours before being ferried to France for shipment to the U.S. That time would account for a single production test flight plus the trip from the Heinkel factory to Denmark. In 10 months, it never flew a single combat mission.

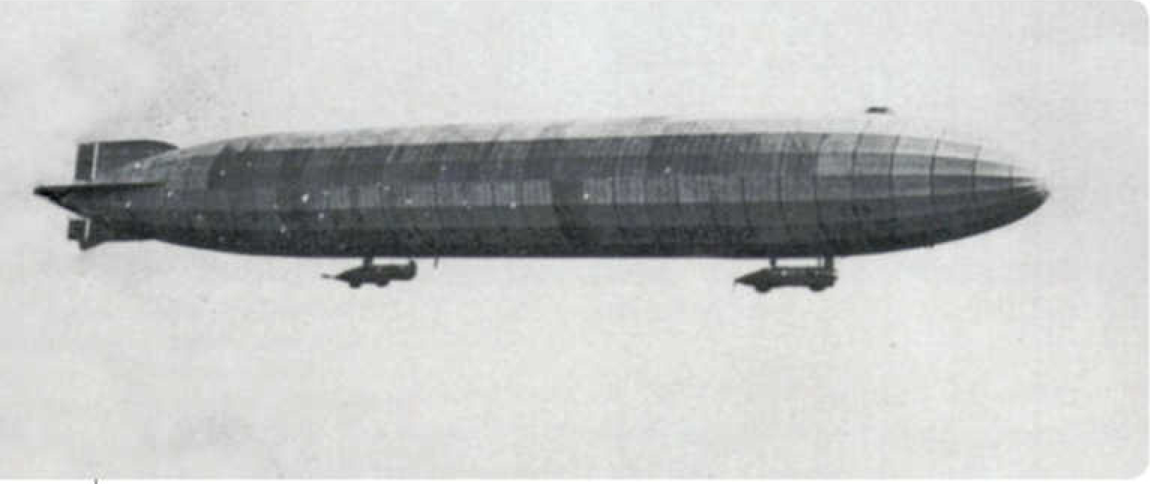
Contributing editor Stephan Wilkinson recommends for further reading: Heinkel He 219: An Illustrated History of Germany's Premier Nightfighter, *by Roland Remp; and* He 219 Uhu Volume I *and* Volume II, *by Marek J. Murawski and Marek Rys.*

OUT OF THE NIGHT
Captain Bernard Smart leads the second flight of aircraft-carrier-based Sopwith 2F1 Camels to bomb the German airship base at Tondern on July 19, 1918, in an illustration by Simon Smith.

THE TONDERN RAID

TO KILL GERMAN ZEPPELINS IN THEIR ROOSTS, THE BRITISH ROYAL NAVY UNVEILED A SECRET WEAPON: **THE AIRCRAFT CARRIER**

BY DON HOLLWAY



BY 1917, WITH THE GERMAN HIGH SEAS FLEET BLOCKADED IN PORT, THE BRITISH ROYAL NAVY'S CHIEF CONCERN WAS NOT ENEMY BATTLESHIPS, BUT AIRSHIPS.

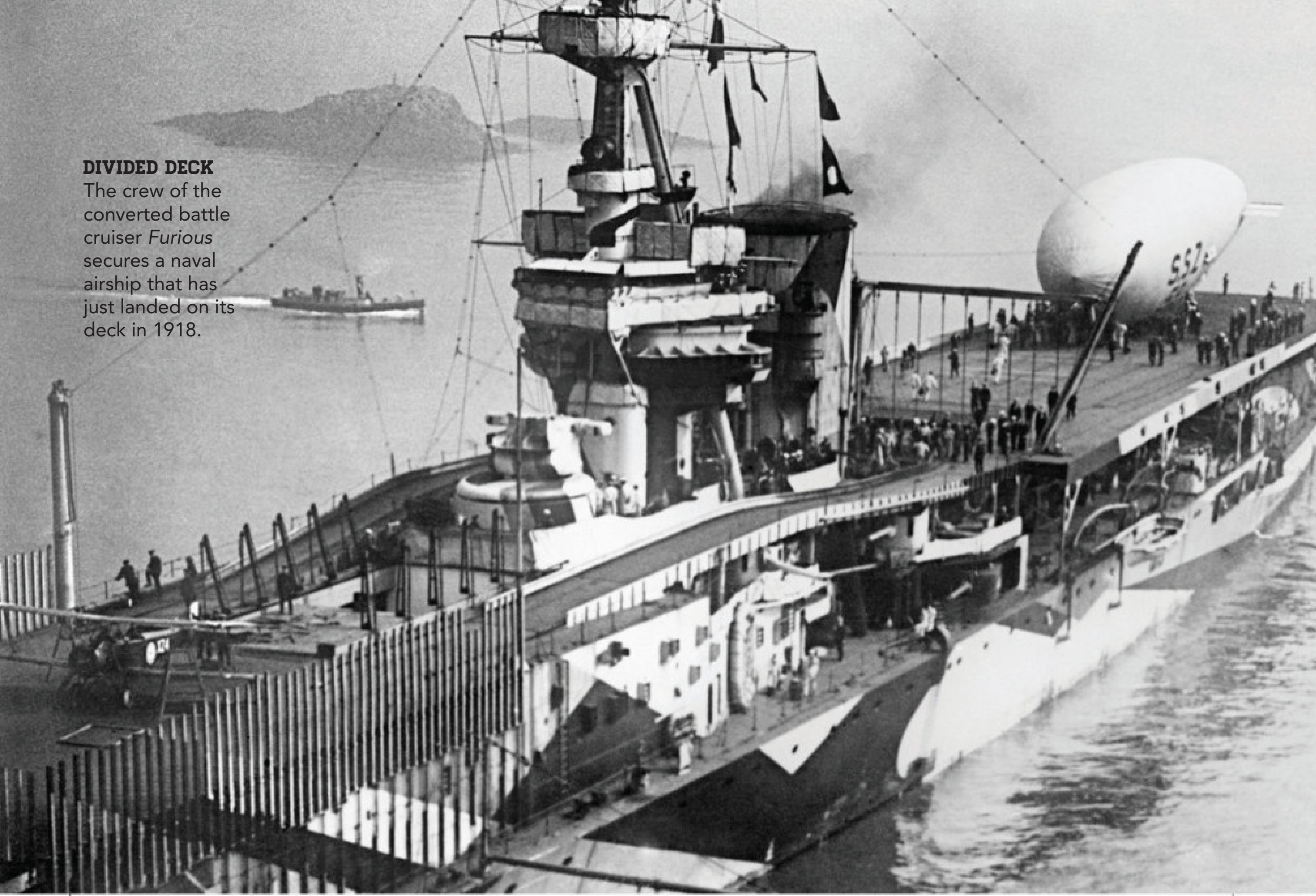
VICTORY AT SEA The Tondern-based *L23* (above) was shot down by a Sopwith Pup launched from HMS *Yarmouth* on August 21, 1917. Frederick Rutland takes off in a Pup from a platform on *Yarmouth* (below).

That April the zeppelin *L23* managed to capture a Norwegian bark hauling contraband lumber, dropping a bomb off its bow and alighting on the water to send a prize crew. On the morning of August 21, *L23* was shadowing the 1st Light Cruiser Squadron off the Danish coast. Over open water, a long way from British soil, zeppelin commander Lieutenant Bernhard Dinter must have been astounded to find his airship attacked by a solitary, short-range Sopwith Pup fighter.

Having launched from a platform on the cruiser HMS *Yarmouth*, Flight Sub-Lt. Bernard Arthur Smart of the Royal Naval Air Service dived from above and behind the airship. "I had just time to see about half a dozen [incendiary rounds] enter the blunt end of the Zeppelin, and a spurt of flame," Smart reported. Winging over to avoid a collision, he looked back to see that "The after end of the Zeppelin was now a mass of flames and had dropped so that the nose was pointing to the sky at an angle of 45 degrees while the flames were fast licking up towards the nose.… [It] continued to burn on the water for three or four minutes."

Shooting down the zeppelin, though, was the easy part. There was no great trick to launching a World War I fighter from a ship, but nobody had quite yet figured out how to get one back aboard. Smart ditched his Pup near a British escort. "The destroyer was alongside in a short time," he noted, "but not before the nose of the machine had sunk and left me just hanging on to the tail." His was the first-ever successful air-to-air attack from a seagoing ship, a tactic that would change naval combat forever.

As early as Christmas Day 1914, British seaplane carriers had attacked the zeppelin base at Cuxhaven, Germany—the Royal Navy's first sea/air strike—but they achieved very little. Meanwhile Captain Horst *Freiherr* Treusch von Buttlar-Brandenfels, commanding zeppelin *L6*, made the first air attack on a fleet at sea. Scoring no bomb hits, *L6* struggled back to base bleeding hydrogen from 600 bullet holes, but none from British aircraft. "The flying boats the English had did not attack our airships," reported Buttlar, the eventual veteran of 221 missions, "because the



DIVIDED DECK
The crew of the converted battle cruiser *Furious* secures a naval airship that has just landed on its deck in 1918.

PREVIOUS PAGES: ©OSPREY PUBLISHING, PART OF BLOOMSBURY PUBLISHING PLC; OPPOSITE ABOVE & RIGHT: HISTORYNET ARCHIVE; OPPOSITE BELOW: IMPERIAL WAR MUSEUM Q65578; ABOVE: IMPERIAL WAR MUSEUM Q20640

latter could always outclimb them."

To cover the North Sea, in March 1915 the Germans constructed two zeppelin sheds at Tondern, on the northernmost border with Denmark, naming them Tobias and Toni. The base included two 10,000-liter fuel storage tanks, hydrogen production and storage facilities, barracks for 600 soldiers and hangars for five Albatros fighters. "If only the English do not know anything about it," Buttlar hoped. "The Danish frontier is damnably near and the spies are good."

The English knew, but could do little about it. Only aircraft could reach across the mine-strewn, U-boat-infested Heligoland Bight to attack Tondern. Two ineffective air raids, though, proved that floatplanes stout enough to operate off open water made poor fighters, and even worse bombers.

What the Royal Navy needed was a fighter base at sea. For that they replaced the forward gun turret on the half-completed light battlecruiser *Furious* with a boxlike hangar, designating its roof as a flight deck. The new aircraft carrier put to sea in July 1917. Now the trick was to actually land on it.

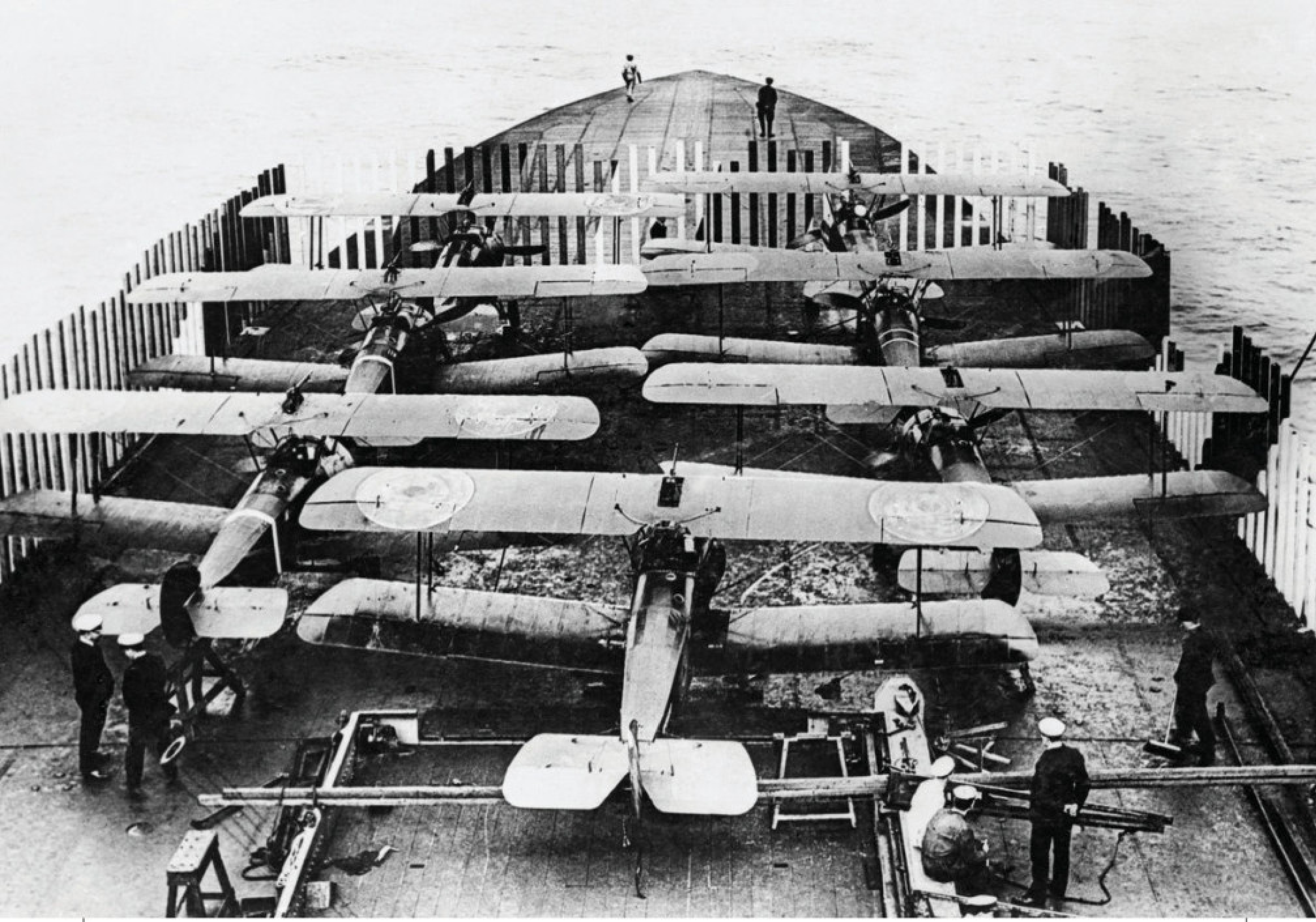
Warships were fast enough, and fighters still so slow, that their speeds comfortably overlapped. On August 2, Squadron Commander Edwin Harris Dunning, side-slipping his Pup over *Furious*' flight deck at practically a hover, made the first airplane landing on a moving ship. During a subsequent attempt, however, his Pup bounced off the deck and went over the side. Dunning drowned. To remedy the dog-leg landing pattern with a straight-in approach, over the winter the British replaced *Furious*' aft turret with another hangar and flight deck, but the ex-cruiser's centerline superstructure and funnel created such turbulence aft that pilots still preferred to ditch. The sacrifice of an airplane per mission mattered less than the expenditure of a torpedo, since in those days torpedoes actually cost more than fighters.

"THE AFTER END OF THE ZEPPELIN WAS NOW A MASS OF FLAMES AND...THE NOSE WAS POINTING TO THE SKY...."

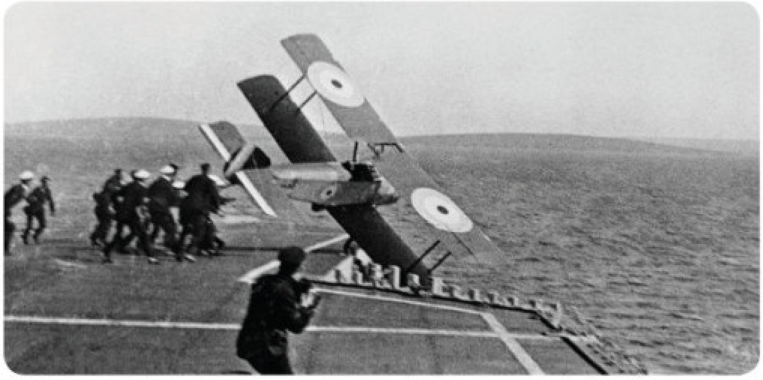
– FLIGHT SUB-LIEUTENANT BERNARD ARTHUR SMART

While the British faltered, the Germans forged ahead. Tondern, which would eventually launch more than a dozen different zeppelins, underwent upgrades to accommodate their ever-increasing size. By January 1917, Toska, a huge third shed (if that's the proper word for a steel building 730 feet long, 220 feet wide and 130 feet high), could hold two zeppelins at once. But the marshy airfield proved almost as impractical for fighters as a ship at sea. "Since a machine had come to grief almost every other day owing to the fact that the landing ground was quite unfitted for aeroplanes," Buttlar remembered, "the [Albatros] fighting flight had been taken away until such time as at least part of the ground could be made more or less suitable for them."

In June 1918, having traded its Pups for two-seat Sopwith 1½-Strutter reconnaissance planes and a naval version of the Sopwith F1 Camel, the 2F1 "Ships Camel," *Furious* joined the 1st Light



IN A TIGHT SPOT *Furious* steams toward Tondern (above) with its complement of Ships Camels. Squadron Commander Edwin Dunning's Pup careens overboard (below) during a fatal landing attempt.



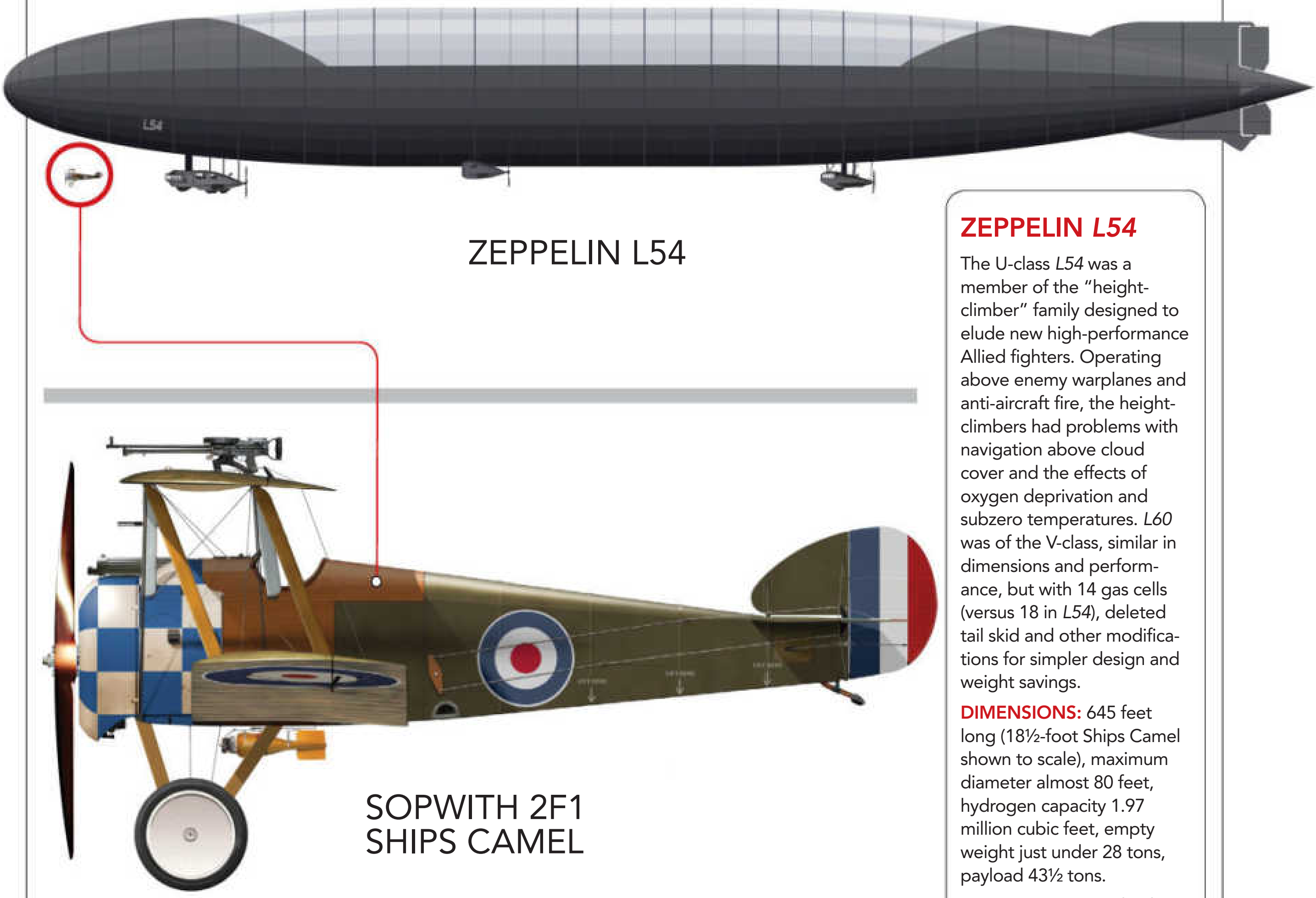
Cruiser Squadron, steaming up and down the North Sea as zeppelin bait. Only a pair of German floatplanes ventured out against this strange new British warship. *Furious* shot back—the only occasion during the war in which it fired in anger—and launched several Camels, one of which forced a seaplane down onto the water.

The carrier's air commander, Lt. Col. Richard Bell Davies, a former floatplane commander and Victoria Cross recipient, urged another attack on Tondern itself. "The best and easiest place to catch a Zep was at her home base," he noted. "…The 1½-Strutters had originally been brought to carriers for this very purpose, but the numbers available were small and as reconnaissance aircraft they were precious.…We would have to use Camels. Their range was not large…but Tondern would be just within range from a point near the Danish coast."

Operation F.5 was approved for late May. Two flights of Camels would make the attack. Captain William Jackson, a veteran of the deck-landing trials on *Furious*, would lead Captain William Dickson and Lieutenant Norman Williams in the first wave. The redoubtable Smart, now a captain, would lead Captain Thomas Thyne and Lieutenants Samuel Dawson and Walter Yeulett in the second. Switching the standard Camel load of four 20-pound Cooper Mark II-A bombs for a pair of special Mark III 49-pounders, they practiced attacks on shed-sized targets marked out on their Scottish air base and dropped live rounds in the Firth of Forth to acquaint themselves with the effects. Davies reluctantly cut 19-year-old Yeulett when he could not master the technique.

Steaming out in late May, *Furious* almost immediately encountered a U-boat contact—possibly the first brush between the two supreme warship types of the future—and retreated to port. On June 27, this time screened by the 1st Light Cruiser Squadron and the 13th Destroyer Flotilla, it put out on Operation F.6. From midnight on the 28th a storm built, lashing the ship with 25-knot winds and 12-foot waves by dawn on the 29th. Just taking the Camels out of their hangar risked having them blown off the deck. The fleet returned to Scotland

TECH NOTES HUNTER AND THE HUNTED



SOPWITH 2F1 SHIPS CAMEL

The Ships Camel was the first seagoing fighter equal to any contemporary land-based aircraft. Captain Bernard Smart's aircraft, thought to be number N6755, wore a blue-and-white nose on the Tondern Raid. The 2F1's upper wing featured a reduced-width center section, shortening the span by 13 inches to just under 27 feet, with steel tube rather than wooden cabane struts and ropes to which ships cranes could hook and retrieve the airplane from the sea. The 18½-foot fuselage was hinged behind the cockpit, so the tail could be folded for stowage. The pilot's stick was connected to the elevator cables via external control levers. Air bags in the rear fuselage served as flotation gear. To facilitate ditching at sea, the wheels were reverse-mounted, with their convex sides in and flat inner hubs outward; when quick-release pins were pulled via cockpit cables, the airstream across their convex sides blew the wheels off the axles.

GUNS: The 2F1 replaced one of the Camel's two cowl-mounted .303-inch Vickers machine guns with an unsynchronized .303 Lewis atop the upper wing—useful against zeppelins. Later mounts let pilots elevate the gun to aim upward and pull it down to reload.

BOMBS: The standard Camel bombload was four 20-pound Cooper Mark II-A or 25-pound Mark II-B bombs, but on the Tondern Raid each plane instead carried two 49-pound Mark III bombs.

ZEPPELIN *L54*

The U-class *L54* was a member of the "height-climber" family designed to elude new high-performance Allied fighters. Operating above enemy warplanes and anti-aircraft fire, the height-climbers had problems with navigation above cloud cover and the effects of oxygen deprivation and subzero temperatures. *L60* was of the V-class, similar in dimensions and performance, but with 14 gas cells (versus 18 in *L54*), deleted tail skid and other modifications for simpler design and weight savings.

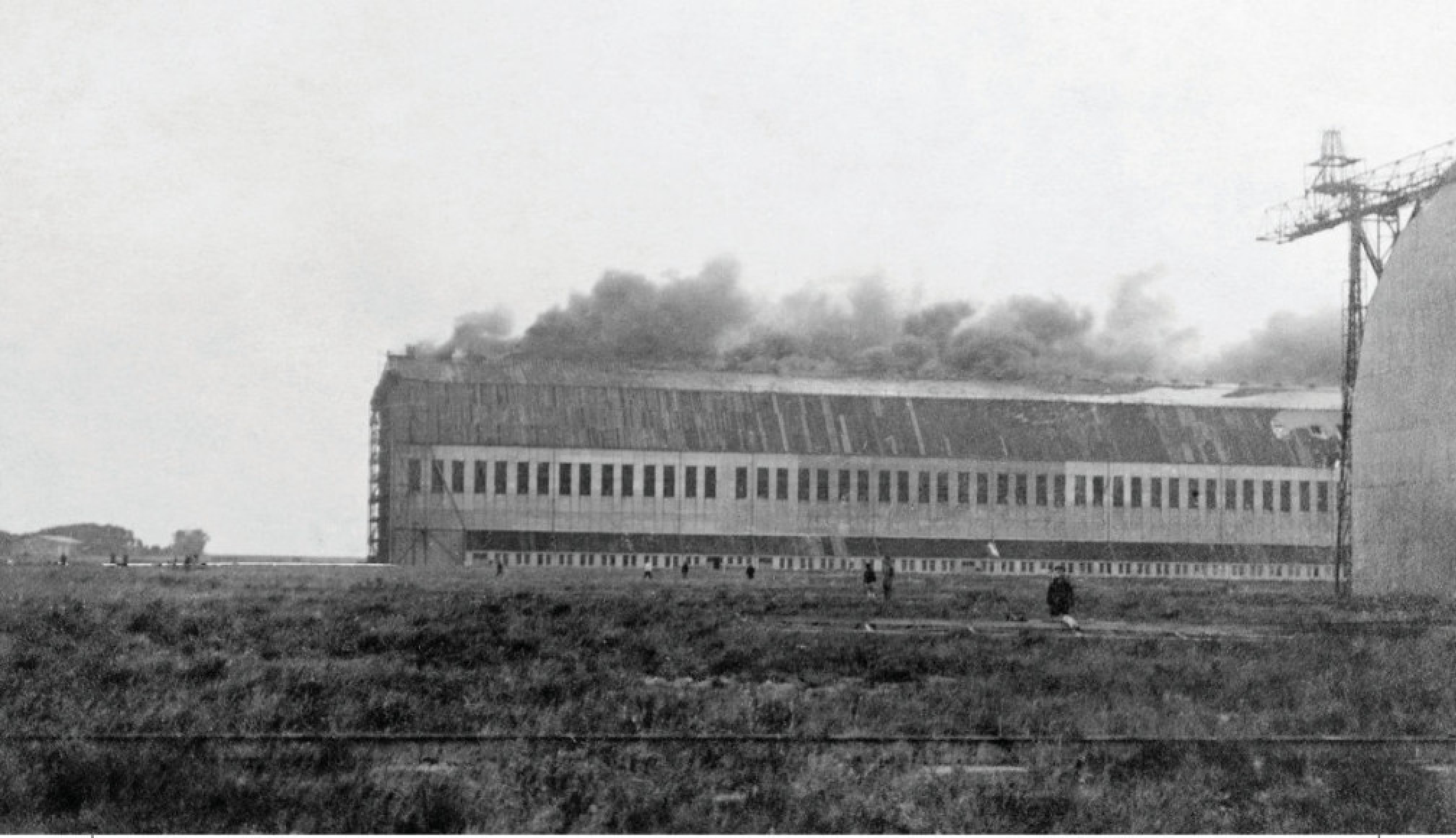
DIMENSIONS: 645 feet long (18½-foot Ships Camel shown to scale), maximum diameter almost 80 feet, hydrogen capacity 1.97 million cubic feet, empty weight just under 28 tons, payload 43½ tons.

ENGINES: Five Maybach MB.IVas, including two driving one propeller from the rear gondola, generating 1,300 total horsepower.

PERFORMANCE: Maximum speed over 60 mph, maximum altitude above 18,000 feet, range over 5,500 nautical miles, bombload more than 3 tons.

OPERATIONS: *L54* first flew on August 13, 1917, and completed 31 missions, 27 under Captain Buttlar-Brandenfels—including two over England, where it dropped more than 12,000 pounds of bombs.

OPPOSITE: IMPERIAL WAR MUSEUM (ABOVE) Q20627, (BELOW) Q80597; ILLUSTRATIONS: DON HOLLWAY



FUNERAL PYRES Smoke billows from the Toska zeppelin shed after it took at least three bomb hits during the raid.

with the Germans none the wiser.

"It was about a week before we were able to try again," Davies wrote. "In the meantime practice continued, Youlet [*sic*] improved rapidly and I agreed to put him back in the team." Operation F.7 commenced at 1203 hours on July 17, with *Furious* accompanied by five battleships of the 1st Battle Squadron and five cruisers of the 7th Light Cruiser Squadron, plus a destroyer escort—the world's first carrier task force. At midnight, leaving the dreadnoughts behind, *Furious* steamed as close as possible to the Danish coast, but before the Camels could be launched another storm blew up. Rather than retreat yet again to port, the carrier and cruisers delayed 24 hours, sailing back and forth under the cover of the battleships, out of sight of land. At nightfall, under threatening skies, *Furious* again steamed landward for a final attempt.

At Tondern, "The evening was fine and clear," Buttlar recalled. "…From the windows of my flat I could see the aerodrome, which was about half a mile away." The smaller sheds were obsolete—Tobias held only a dirigible balloon and Toni was being dismantled—but the double shed, Toska, housed two zeppelins, Buttlar's *L54* and the even newer *L60*, with almost 2 million cubic feet of hydrogen each, not to mention several tons of bombs waiting to be loaded.

Out in the North Sea, *Furious* braved deteriorating weather. "With the wind as it was," Davies reckoned, "it seemed doubtful the Camels could get back to the ship after the attack. However… they would certainly have enough petrol to cross the Danish frontier." Facing the loss of his precious few carrier-trained pilots to drowning or internment, Davies nevertheless gave the go-ahead. On the morning of July 19, at 0315 local time, about 80 miles northwest of Tondern, *Furious* launched seven Camels, in two waves, on their historic raid. Almost immediately they encountered trouble. Thyne's plane suffered engine problems, and he was forced to turn back and ditch. The rest sighted the Danish coast and followed it south, turning inland off Tondern. Jackson, in the lead, sighted the target at approximately 0435.

"While I was still half asleep I seemed to hear the whir and whiz of a propeller….It was not the note of a Zeppelin at all!" remembered Buttlar. "…I jumped up and rushed to the window, from which I could get a view of the whole aerodrome. Suddenly a shadow passed over our house, a few yards above the roof, absurdly low….A British aeroplane!"

That may have been Dickson, whose first bomb, released from 700 feet, inadvertently landed in Tondern's market square. Jackson, though, went straight for the immense double shed. At least three 50-pounders pierced its roof. Inside, almost 4 million cubic feet of hydrogen awaited only a spark to ignite.

"My heart was in my mouth," said Buttlar, who peddled a bicycle toward the fray. He saw Toska's windows light up from inside and fire gush through the holes in its roof. Luckily for the Germans, in preparation for the day's operations, the huge shed doors were open; the funeral pyres of the dying zeppelins were able to escape rather than building up inside. "In a terrible straight column, lit up with flames, the smoke rose skyward from the shed…," the captain continued. "Gruesomely beautiful it was, this giant flame of sacrifice in which our *L54* and *L60* perished….I was cycling like mad toward

ABOVE: IMPERIAL WAR MUSEUM Q47941; OPPOSITE ABOVE: HISTORYNET ARCHIVE; RIGHT: IMPERIAL WAR MUSEUM Q47940

the aerodrome when suddenly a terrible thought flashed through my mind. The heavy bombs were still in the shed!" A detachment braved the flames inside Toska to roll the stored bombs—some already dangerously hot—outside.

Either by design or poor navigation, Smart's flight arrived 10 minutes after Jackson's, and not from seaward but from the east, inland. They found the Tondern defenses now wide awake. "Three A.A. batteries close together attracted my attention," reported Smart. "…When in position I gave the signal and dived on the remaining large shed [Tobias], releasing my bombs at 800 to 1,000 feet. The first fell short, but the second hit the centre of the shed, sending up a quantity of smoke or dust." The dirigible inside Tobias flamed up. Another bomb struck a wagon loaded with hydrogen cylinders, but failed to explode.

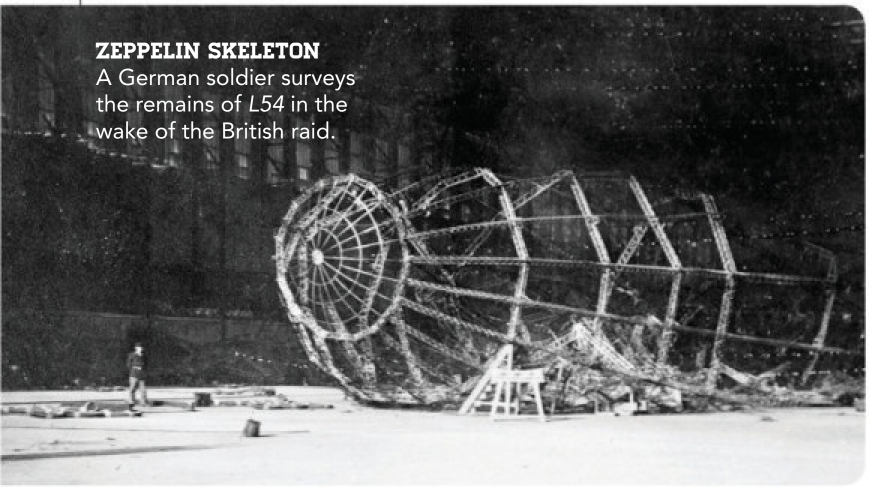
"In the centre of the aerodrome, in front of their hutments, the seamen were standing with nothing on but their undergarments, or half naked, and firing with their rifles as hard as they could," recounted Buttlar. "They might just as well not have been there. The Englishmen continued circling round without climbing an inch higher."

Quite the contrary, according to Smart: "The whole surroundings were thick with mechanics or soldiers armed with rifles and machine-guns, which gave so disconcerting a fire that I dived with full engine to 50 feet and skimmed over the ground in a zig-zag course to avoid it, and by the time I got clear I was unable to see the sheds on account of the thick screen of smoke from the first shed."

Jackson, Dickson and Williams were long gone. Smart followed. "The clouds were now very low and a general haze made visibility bad," he reported. "…I slowed down to wait for the others, but after doing a circuit at slow speed and with still nothing in sight, I decided it was inadvisable to wait longer as I had already been in the air nearly two hours and the wind had increased."

"GRUESOMELY BEAUTIFUL IT WAS, THIS GIANT FLAME OF SACRIFICE IN WHICH OUR *L54* AND *L60* PERISHED."

– CAPTAIN HORST VON BUTTLAR-BRANDENFELS



ZEPPELIN SKELETON
A German soldier surveys the remains of *L54* in the wake of the British raid.

Out at sea the fleet anxiously waited for the Ships Camels to return. "At last [they] hove in sight," Davies later recalled, "and landed in fairly rapid succession near the destroyers."

But only two. Dickson put down at 0555 and was picked up. Smart spent 15 minutes on the tail of his bobbing, half-sunken plane, losing his lifebelt, swallowing a good bit of seawater and feeling "done in by the time the boat arrived…three able bodied seamen clutched hold of me and hauled me aboard like a sack of flour."

No other Camels returned. Williams, Jackson and Dawson decided they didn't have the gas. They landed in Denmark and were interned, but not closely watched. All three soon escaped to Britain. Yeulett evidently misjudged his fuel status. Days later his remains and Camel washed up on a Danish beach. He was the only fatality in the attack on either side.

"After hanging about off the coast until quite sure that the rest must have come down somewhere (we hoped in Denmark)," reported Davies, "we shaped course for the Forth." Mission accomplished.

"I stood facing the burnt-out wreck of my ship," Buttlar recalled of the collapsed duralumin skeletons inside Toska. "I had watched many ships perish, but this was the first time I saw my own destroyed." He could count himself lucky. Most dying zeppelins' crews burned with them, but at Tondern only four men were wounded. "The attack had been carried out extremely smartly, and had been an entire success," Buttlar admitted. "Two airships had been completely destroyed, and the airship base had been rendered harmless for some considerable time." In fact, Tondern was thereafter only used as an emergency landing field. After the armistice the border changed; instead of one of the northernmost towns in Germany, Tondern became Tønder, one of the southernmost towns in Denmark.

The secret of the aircraft carrier was out. Though *Furious* launched no more raids during the Great War, afterward it was rebuilt as a full-length flattop, the only aircraft carrier to serve in both world wars. By then carriers had replaced battleships as the supreme weapon at sea, today rivaled only by the ballistic missile submarine. A *Nimitz*-class nuclear-powered supercarrier comprises nine squadrons of fighter-bombers, helicopters and support planes, over 60 aircraft all told, more than in the inventory of many nations. Each carrier is a mobile air force, the ultimate combination of warship and warplane—one of the world's oldest weapons, and the newest. ✢

Frequent contributor Don Hollway recommends the websites tondernraid.com and zeppelin-museum.dk. For more text, images and video, visit donhollway.com/tondernraid.

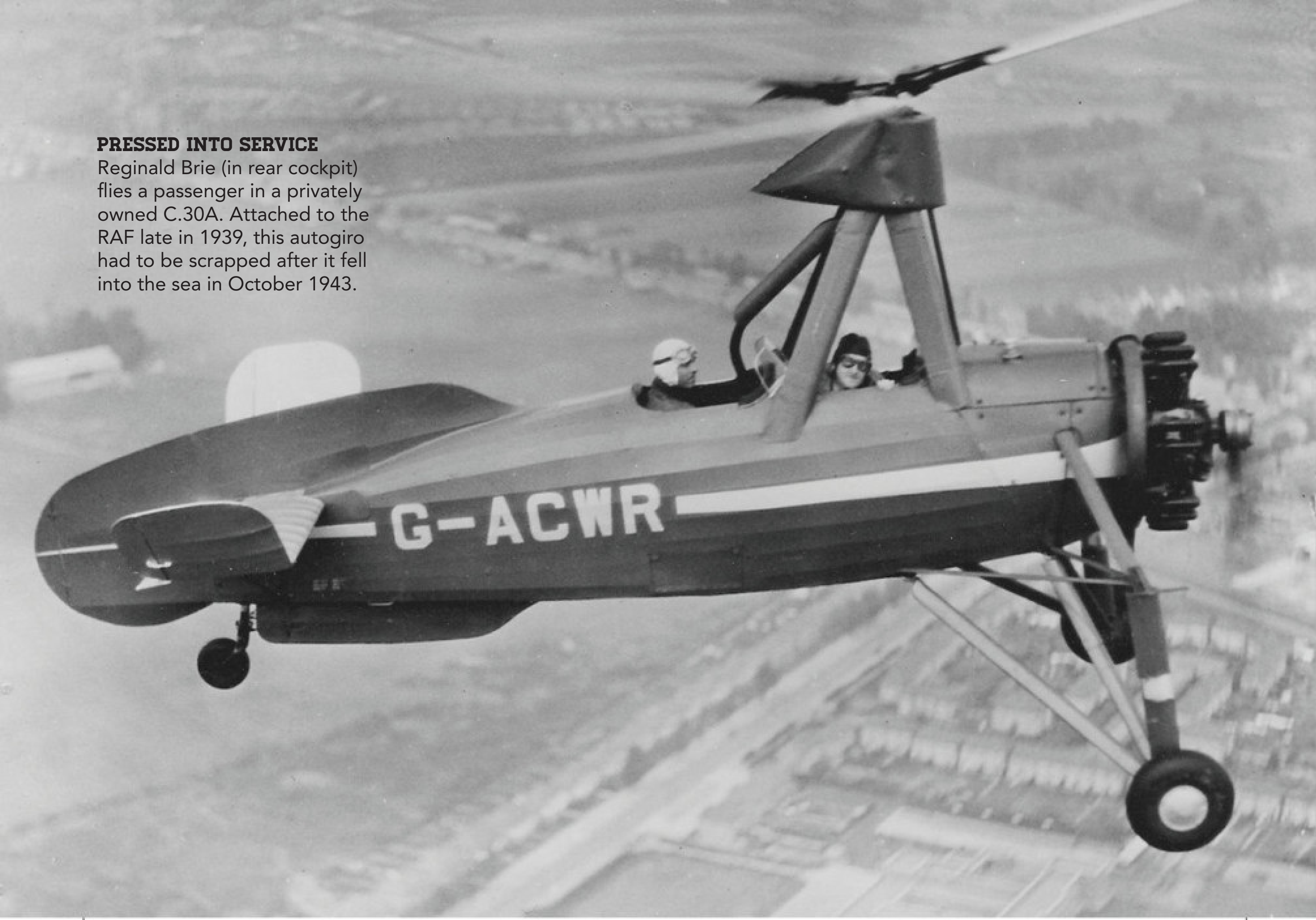
ZO-CCT

AUTOGIROS AT WAR

HOW AN UNLIKELY AIRCRAFT HELPED WIN **THE BATTLE OF BRITAIN**

BY BRUCE H. CHARNOV

ROTARY THINKING
RAF Coastal Command officers examine an Avro Rota I—a license-built version of the Cierva C.30A—used in British army cooperation work.



PRESSED INTO SERVICE
Reginald Brie (in rear cockpit) flies a passenger in a privately owned C.30A. Attached to the RAF late in 1939, this autogiro had to be scrapped after it fell into the sea in October 1943.

“NEVER IN THE FIELD OF HUMAN CONFLICT HAS SO MUCH BEEN OWED BY SO MANY TO SO FEW,” DECLARED WINSTON CHURCHILL ON AUGUST 16, 1940, while leaving a bunker at the Royal Air Force base at Uxbridge. That sentiment would form the basis of a memorable speech to Parliament four days later, praising RAF Fighter Command’s efforts in the Battle of Britain. The prime minister’s words rallied Britons at a time when the fate of their nation—and of Europe as a whole—hung in the balance. Almost forgotten since then is that the “few” actually owed a great deal to the even fewer: the Autogiro pilots who had calibrated the Chain Home system, a string of radar stations that warned the RAF of approaching enemy aircraft.

The British military became interested in the Autogiro, invented by Spanish engineer Juan de la Cierva, as early as 1925. After evaluations, however, the RAF found the performance of the Cierva C.19 Mk. III unacceptable due to its poor control at low airspeeds. In 1933, when the Cierva Autogiro Company’s chief pilot and flying manager, Reginald A.C. Brie, demonstrated the improved C.19 Mk. IV during annual army maneuvers at Salisbury, authorities began to envision a possible military role for rotorcraft.

“Reggie” Brie had joined the army in 1914, and by 1915 was serving as a gunner on the Somme. Transferring to the Royal Flying Corps in 1917, he gained a commission as an observer with No. 104 Squadron, flying de Havilland D.H.9s. After being shot down over Germany in 1918, he became a prisoner until he was repatriated at Christmas. Leaving active military service in 1922, Brie was recalled to duty in the fall of 1939, largely due to his Autogiro experience with Cierva.

By then the British had adopted the Cierva C.30A, which featured a tilting rotor operated by the pilot via a long control arm, greatly enhancing low-speed performance. The RAF envisioned two distinct roles for the C.30A: army cooperation (liaison) and naval functions. The Air Ministry had ordered 10 C.30As, designated as the

PREVIOUS PAGES: IMPERIAL WAR MUSEUM CH 5423;
ALL IMAGES THESE PAGES: COURTESY OF BRUCE H. CHARNOV

Rota I, for the former task on July 9, 1934, later ordering two naval models with floats, designated Rota IIs.

The first 10 Rotas were built under license by Avro and given the type number 761. In September 1934, Flight Lts. W. Humble and R.H. Haworth-Booth trained on the C.30A, then were assigned as instructors at the RAF School of Army Cooperation at Old Sarum. By November 22, six Rotas had been accepted for service. The new Autogiro's obvious potential for reconnaissance and observation prompted the War Office to stop using tethered observation balloons.

By September 1935, Britain's six Rotas—now with trained pilots—assumed a military role in the combined RAF/army war games, but with limited success. While the authorities had originally assigned the Autogiros inter-unit communications, artillery observation and reconnaissance duties, the C.30A's performance under actual battlefield conditions left much to be desired. The two-seater aircraft, powered by a 140-hp Armstrong-Siddeley Genet Major IA engine, required a takeoff run of 450 feet and suffered from ground resonance when landing on rough terrain, sometimes resulting in rotor damage. Those problems led to additional research, including wind-tunnel testing of a model at the National Physical Laboratory and, in 1937, at Chalais-Meudon outside Paris.

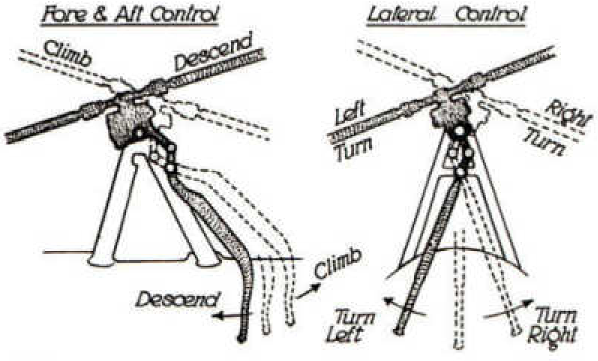
The RAF made no further efforts to acquire additional Rota Is, relying instead on light aircraft for observation, communication and reconnaissance. But the Rota I remained in the RAF inventory at Old Sarum, seemingly without a defined role. That would change in 1939 with the onset of war.

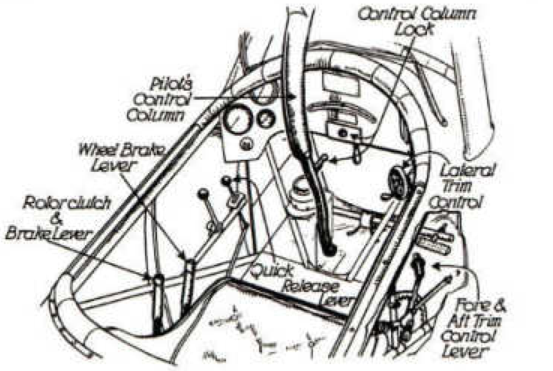
Reggie Brie, flying a C.30A under contract with Cierva, played a key role while attached to No. 24 Communications Squadron in calibrating Britain's new Chain Home radar. The Autogiro had a special aerial attached to a calibrating radio transmitter, installed under the direction of Bernhard B. Kinsey of Cambridge University. Brie's initial assignment was to calibrate a main high-level radar station in the Dover area by flying in tight circles over known points while the station took readings. His success led to the creation in July 1940 of specialized units dedicated primarily to radar calibration.

Having finally found a vital role for the Autogiro, the British military also requi-

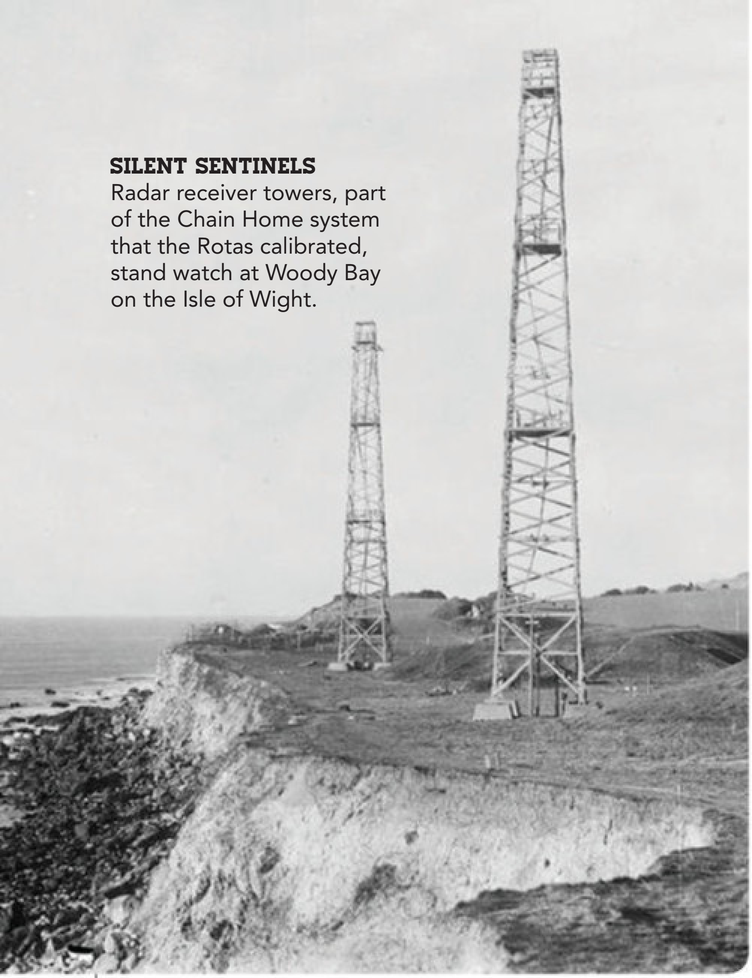
AUTOGIRO EXPERT Brie with the C.19 Mark IVP, the first Cierva fitted with mechanical rotor spin-up drive, in 1933.

TECH NOTES





KEY TO CONTROL The C.30A/Rota I (shown at top being rolled out for a radar calibration mission) featured a long control arm attached to a tilting rotor mount (illustrated above) that gave pilots direct control over the Autogiro's movements and greatly improved low-speed handling.



SILENT SENTINELS
Radar receiver towers, part of the Chain Home system that the Rotas calibrated, stand watch at Woody Bay on the Isle of Wight.

IMPERIAL WAR MUSEUM CH 12174

ALL THAT STOOD BETWEEN NORMAN HILL AND CERTAIN SHOOTDOWN WERE THE AUTOGIRO'S CAPABILITIES.

sitioned civilian C.30As. Along with the Rota Is, these were assigned to eight radio servicing units as part of No. 74 (Signals) Wing, administratively attached to No. 19 Fighter Squadron at Duxford. Those units were later consolidated into No. 1448 Rota Calibration Flight, based at RAF Hendon, Odiham and Duxford. This mixed squadron of Autogiros and Bristol Blenheim Mk. IVs was initially commanded by Flight Lt. M.J.B. Stoker and later by Brie, who was subsequently promoted to wing commander. Pilot strength was slowly increased by adding experienced civilian Autogiro pilots. In June 1943, the Autogiros were ordered to No. 529 Squadron, the RAF's first operational rotary-wing unit, flying from Halton and Crazies Hill near Henley-on-Thames.

Flight Officer Norman Hill's mission on July 14, 1943, was to calibrate CHF (Chain Height Find) Rye3 Coastal Radar. His task included orbiting about a dozen marks on land and sea. Special markers were dropped beforehand for the sea runs, and the pilots were required to maintain the smallest possible orbit around those markers for a period of three to six minutes at altitudes of 2,000, 3,000 and 4,000 feet, while a "squegger" transmitted signals to the radar stations.

The sun was setting late that afternoon as Hill was completing his final calibration exercise. He passed through some disturbed air, then realized there were other aircraft nearby. Spotting a plane flying below him, he recognized it as a Focke Wulf Fw-190. Hill knew the German fighter was capable of flying more than three times faster than the Rota's theoretical maximum speed of 110 mph (in reality closer to 90 mph). All that stood between him and certain shootdown were the Autogiro's unusual capabilities.

By this time the German had looped upward from below the Rota, preparing for a strafing run. Sweating profusely, Hill waited until the last moment before tilting the rotorhead backward, causing the Rota to slow and flare upward. The German passed harmlessly overhead. Hill then pushed the stick hard to port, and the Rota turned and dived toward the ground, a maneuver the German pilot declined to follow.

But as Hill struggled to regain control of the rotorcraft, now locked in a steep dive, a second Fw-190 appeared. Again Hill's skills and the Rota's maneuvering capability saved the day: This time he turned directly toward the fighter, presenting the smallest possible profile to the attacking aircraft—and likely surprising its pilot. The German broke off at the last instant, passing just below the Rota.

The entire encounter had taken just three minutes. The Rota was low on fuel, though it was considerably inland from where the confrontation had started, and Hill continued in a steep but controlled descent to a safe landing.

Brie, meanwhile, had been ordered to the British Purchasing Commission in Washington, D.C., where he played a role in the attempted acquisition of additional rotorcraft from the Pitcairn-Larsen Autogiro Company. He later participated in evaluating and buying Sikorsky helicopters.

With Brie unavailable, 529 Squadron was commanded by another Cierva veteran, Sqd. Ldr. Alan Marsh, whom Brie had gotten transferred from Farnborough as his successor. The squadron was disbanded on October 20, 1945, with the Rota pilots having accumulated a total of 9,141 flying hours. At its peak, 529 had 17 C.30s in service.

Brie would be awarded British Helicopter License No. 1. A founding member of the Helicopter Society of Britain and American Helicopter Society, he received the Royal Aeronautical Society Silver Medal for Aeronautics while leading the Helicopter Experimental Unit of British European Airways in 1947. He later joined Westland, where he planned and oversaw the commissioning of the Battersea Heliport.

When Brie died in 1988, few realized the contribution he and his fellow Autogiro pilots had made during some of WWII's darkest days. In a life marked by achievement, those were surely Reggie Brie's finest hours. ✢

Bruce H. Charnov, an associate professor emeritus at Hofstra University, is the author of From Autogiro to Gyroplane: The Amazing Survival of an Aviation Technology. *He is a founding member and serves on the board of directors of the Vertical Flight History Division of the American Helicopter Society. For further reading, he recommends:* Juan De La Cierva and His Autogiros, *by Arthur W.J.D. Ord-Hume; and* Cierva Autogiros: The Development of Rotary-Wing Flight, *by Peter W. Brooks.*

...like Winston Churchill, Rosa Parks or Jesse James
Search **PERSONALITIES** at HistoryNet.com
More than 5,000 articles available online

HISTORYNET
HistoryNet.com

LIBRARY OF CONGRESS

THE ART OF FLYING

by Joshua Condon, Assouline Publishing, 2015, $175.

Art book publisher Assouline partnered with the private air charter firm VistaJet to produce this extravagant offering, showcasing the glamour evinced by old-time airliners and uber-sophisticated private jets. Journalist Josh Condon, whose informed and expressive text aptly supplements the book's dazzling imagery, defines the art of flying as prioritizing passenger comfort—and joy. >

> Today's weary air travelers, who are routinely shoehorned into six-abreast, elbow-to-elbow seating on delayed jetliners, would likely be astounded by the opulence depicted in this book. An archival image from at least 50 years ago shows elegantly attired passengers enjoying Lufthansa's top-of-the-line service, apparently oblivious to engine noise and turbulence, just as if they were having cocktails at Delmonico's. Another photo shows a small army of smiling chefs, decked out in starched white jackets and toques, climbing an airstair to deliver platters full of fresh-baked pastries to ticketholders aboard a silver ship in the storied Eastern Air Lines fleet.

Sprinkled throughout the book are entertainment superstars riding high. A young and trim Elton John is shown making a toast at a piano bar aboard his private jet. Elvis, Sinatra and Zsa Zsa Gabor are all pictured getting into or out of airplanes. There are even stills of Bergman and Bogart in the climactic airport scene from the movie *Casablanca*.

One senses that this coffee-table book was envisioned by VistaJet as a party favor for its jet-setting clientele. Of course, anyone who can pick up the phone or send a text message to summon a private jet from an on-call inventory has already arrived. This elegant volume lets the rest of the flying public in on the luxurious style in which past and present-day high rollers travel the globe.

Philip Handleman

THE AVRO MANCHESTER

The Legend Behind the Lancaster

by Robert Kirby, Casemate Publishers, 2015, $85.

Only 202 Avro Manchesters were built, and the airplane was retired from operational service in World War II after less than a year and a half. The Manchester was indisputably one of the RAF's failures, but it was also the progenitor of a whole family of highly successful, long-lived military aircraft that included the Lancaster and Lincoln bombers, the York transport and the Shackleton maritime patrol plane. For that reason alone it deserves the hitherto-denied historical treatment that Robert Kirby has delivered.

Kirby explains in detail how in many ways the Manchester represented a quantum leap in RAF bomber development. The plane was designed to meet an Air Ministry requirement specifying a twin-engine bomber, however, and that was where its Achilles' heel lay. In an effort to satisfy the Air Ministry's performance requirements, Avro fitted the Manchester with two newly developed Rolls-Royce Vulture engines. The Vulture proved to be one of R-R's few duds, and the Manchester would be the only operational aircraft equipped with it. Ostensibly capable of producing 1,760 hp, the Vulture rarely achieved its full rated power and, in the event of an engine failure, it was hard to keep the bomber aloft. Of 193 operational Manchesters, 30 were lost due to engine failures, while many others barely made it home.

Still, Bomber Command recognized the aircraft had potential. Avro's design team concluded that the best way to salvage the Manchester was to replace its two bad engines with four good ones. The result would initially be known as the Manchester Mk. III. By then, however, the Manchester had acquired such a bad reputation in the RAF that the four-engine bomber's name was changed to Lancaster.

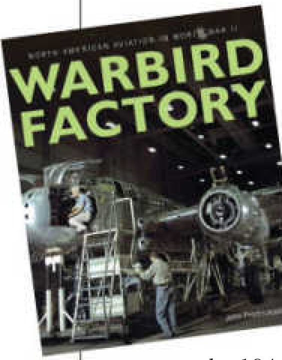
The Avro Manchester offers anecdotes from former crew members about harrowing ordeals over enemy territory, as well as flying the unreliable bomber in non-combat situations. This is undoubtedly the definitive history of its less-than-legendary subject, and it's a must for those interested in reading about the challenges that Bomber Command faced.

Robert Guttman

WARBIRD FACTORY

North American Aviation in World War II

by John Fredrickson, Zenith Press, 2015, $40.

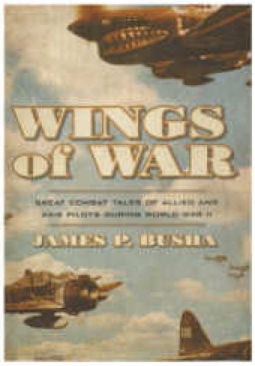


Warbird Factory is a perfect exposition of how the American public and the U.S. aviation industry shook off the effects of a deadening depression and sprang into action with the onset of WWII. The leap from primitive designs, low production rates and an amazingly small workforce was unprecedented. The demand for equipment to fight a world war was met with an enthusiastic response from public and industry alike that dazzled the world with a huge volume of high-quality aircraft. Annual production neared 100,000 aircraft per year by 1944, with complex designs such as the Boeing B-29 clawing into combat.

Farm fields had to be converted to huge factories and men and women who had never worked with anything more complicated than a scythe were suddenly operating complex, sensitive machinery. This book clearly illustrates the leap from field to flight, with its strong focus on the American players, ordinary citizens who became citizen soldiers almost overnight.

Warbird Factory details the birth, development and ultimately the success of the North American aces: the T-6 Texan, B-25 Mitchell and P-51 Mustang. And to its credit the book focuses on the many individuals whose contributions have not previously been covered. It raises some questions as well about our nation today. It is all very well to talk about the "greatest generation," but this book describes in depth how the people, civil and military, moved North American Aviation from a newcomer to a dominant player in its field. It helped that the NAA aircraft were designed from the start for both production and maintenance ease. The question, of course, is whether the current generation would be capable of similar performance.

Walter J. Boyne


WINGS of WAR
GREAT COMBAT TALES OF ALLIED AND AXIS PILOTS DURING WORLD WAR II
JAMES P. BUSHA

WINGS OF WAR

Great Combat Tales of Allied and Axis Pilots During World War II

by James P. Busha, Zenith Press, 2015, $30.

Long before he became director of publications for the Experimental Aircraft Association in Oshkosh, Wisc., Jim Busha perfected the art of interviewing air war veterans. He honed his skill during an earlier career in law enforcement, when he learned the value of listening to people tell their side of the story. Busha's often poignant and always informative writing on the pilots and crews who forged history in war-torn skies has become a staple of the EAA's magazines.

His latest book introduces readers to a diverse grouping of WWII airmen from the U.S. and other countries on both sides of the conflict. The greatest air war of all time is described through 35 unvarnished narratives from men who flew in it. This is action-packed drama at its adrenaline-pumping best.

Some of the names will be recognizable, like U.S. Navy Medal of Honor ace Alex Vraciu. However, most of the vignettes are from lesser-known fliers. Conveying the air war as it was experienced by the everyday combatants adds inestimably to the historical record. The author has performed a great service by capturing firsthand accounts of aged veterans, for otherwise their stories might never have been saved.

An extra bonus is the book's stunning visual content. Almost every page is illustrated with either an archival black-and-white photo (including rare shots from aviation photographer John Dibbs' files) or a stunning air-to-air color image of a restored warplane by the EAA's own Jim Koepnick.

Philip Handleman

OPPOSITE: ASSOULINE PUBLISHING

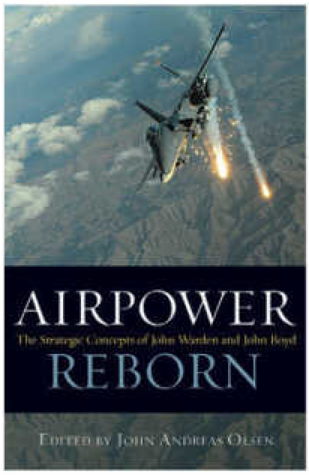
AIRPOWER REBORN

The Strategic Concepts of John Warden and John Boyd

edited by John Andreas Olsen, Naval Institute Press, 2015, $49.95.

John Andreas Olsen, a colonel in the Norwegian military, has made a name for himself as the author and editor of a growing list of learned books about air power. He has drawn on top practitioners and academicians as contributors for this compilation, presenting five essays on the concepts of two former U.S. Air Force fighter pilots and air power visionaries, the irascible John Boyd and the quixotic John Warden. One of the essays is written by Warden himself, reprising and expanding upon his seminal 1986 thesis, which mapped out a theoretical air campaign based on the idea that an enemy can be defeated by bombing command-and-control nodes without the need to go head-to-head with massed forces.

Warden, whose thesis provided the foundation of the successful Desert Storm air campaign in 1991, writes that the enemy must be viewed as a system, in which a five-ring model is used to identify centers of gravity. The point is to be smart about target selection because war's purpose is not simple destruction but attainment of end-game strategic objectives. Another chapter praises Boyd for developing the so-called OODA (observe-orient-direct-act) loop, a shorthand description of the decision cycle. Boyd profoundly influenced military thinking by arguing that wars can be won if military leaders get inside the loop and outpace their opponent's decision-making.


AIRPOWER
The Strategic Concepts of John Warden and John Boyd
REBORN
Edited by John Andreas Olsen

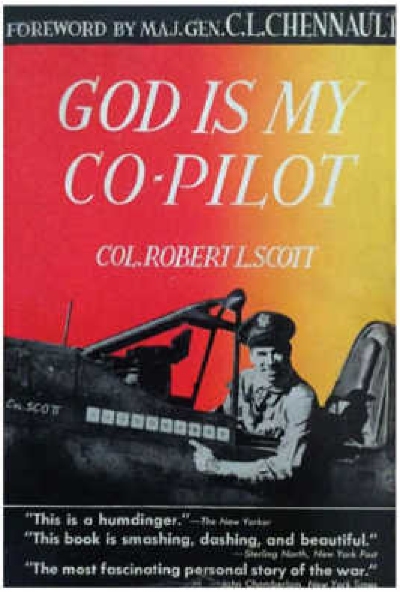
Each chapter reflects solid scholarship and offers thought-provoking perspectives that will appeal to serious students of air power theory and grand strategy.

Philip Handleman

CLASSICS

GOD IS MY CO-PILOT

by Col. Robert L. Scott, 1943.


FOREWORD BY MAJ.GEN.C.L.CHENNAUL
GOD IS MY CO-PILOT
COL.ROBERT L.SCOTT
"This is a humdinger." —The New Yorker
"This book is smashing, dashing, and beautiful." —Sterling North, New York Post
"The most fascinating personal story of the war." —John Chamberlain, New York Times

I grew up hearing stories about the air war in China. During World War II, my father was an aircraft electrical systems mechanic in Maj. Gen. Claire L. Chennault's Fourteenth Air Force. My father knew and worked on the aircraft of many of the legendary pilots of that theater, including Colonel Robert L. Scott during his second tour of duty in China in 1944-45.

I was probably 12 or 13 in the late 1950s when I read *God Is My Co-Pilot* for the first time. I re-read it for the umpteenth time about two months ago. It was one of the first memoirs to come out of WWII, and it remains to this day one of the greatest. First published in 1943, it stayed in print well into the late 1960s.

God Is My Co-Pilot is the story of Scott's first tour of duty in the China-Burma-India Theater, from July 1942 to October 1943. During that period he flew 925 hours of combat, totaling 388 missions, and shot down 13 confirmed Japanese aircraft, plus a number of probables. He was one of America's earliest aces of WWII, and one of the first double aces.

Scott's story was one you could not make up. A career fighter pilot, he was told in early 1942 that at age 33 he was too old to fly combat. Determined to get into the war, he bluffed and outright lied his way to India as a B-17 copilot, despite having no previous four-engine time. Once in Asia, he flew C-47 airlift missions over "the Hump" into China, where Chennault's American Volunteer Group, popularly known as the Flying Tigers, had been fighting the Japanese for months.

Because the C-47s had no fighter escorts, Scott managed to convince Chennault to "loan" him a P-40 for that purpose. Before too long, Scott was unofficially flying missions with the AVG members, learning about their tactics firsthand.

In July 1942, the AVG was officially absorbed into the U.S. Army Air Forces, although only a few of the AVG members chose to remain in China thereafter. On the recommendation of Chennault and China's president, Chiang Kai-shek, Scott was assigned to command the newly designated 23rd Fighter Group, composed initially of a scratch team of whatever fighter pilots and ground crew they could pull together from within the CBI theater. Chennault was recalled to active duty and assigned to command the China Air Task Force, which later grew into the Fourteenth Air Force.

It was a poor man's war in China, and Scott tells the story of how Chennault's men continually had to beg, borrow and sometimes steal the necessary fuel, tires, ammunition and especially spare parts to keep their airplanes flying. Cannibalization became the order of the day, with any unrepairable aircraft stripped for every last part that could be even remotely reusable. Despite those handicaps, however, Scott and his pilots continued the AVG's record of rolling up vastly superior numbers of enemy kills against the small number of friendly losses.

God Is My Co-Pilot was and still is a great book, though unfortunately it was turned into a mediocre WWII B movie. Even though Scott himself served as a technical adviser for the film, he later admitted that several overly melodramatic scenes made him cringe.

Over the years a good many books have been written about America's air war in China. *God Is My Co-Pilot* and Chennault's own *Way of a Fighter* remain two of the essentials.

David T. Zabecki

AIRWARE

FLYING TIGERS

Shadows Over China

Ace Maddox, 2016, $19.99.

The American Volunteer Group, better known as the Flying Tigers, has always conjured romantic images of World War II aviation. *Flying Tigers: Shadows Over China* (*FTSOC*) is among the few action games to feature the celebrated group of American volunteers who served in the China-Burma-India Theater.

A quick look at the game reveals an interesting quirk: *FTSOC* is less focused on the AVG than its title would suggest, and yet this proves to be a bonus for history fans. Players indeed fly the iconic shark-toothed Curtiss P-40 Warhawk, but several missions feature multinational action with the Royal, Royal Australian and Indian air forces. This may introduce some intriguing characters to players, including Karun Krishna Majumdar, who flew Westland Lysanders with the Indian Air Force. Though a poor match for enemy fighters, the Lysander was apparently versatile in its time.

Some missions are fictional, but most are accurate with regard to dates and locales. In addition to Majumdar's February 4, 1942, raid on Mae Hong Son, the game features an unsuccessful attempt by RAF Vickers Vildebeests to torpedo the Japanese cruiser *Sendai* on December 8, 1941. There's also action around the Assam-Burma-China airlift and more missions around Mingaladon. In another, players fly a Bristol Blenheim on May 22, 1942, when Japanese ace Tateo Kato is shot down by a Blenheim gunner.

Other elements aren't as realistic, with the flight models subject to very loose physics. The graphics are dated, though performance is fine on a midrange PC. *FTSOC* is still pending release as of this writing, but while it saw continuous improvements in stability and general play during development, I still found the flight mechanics cumbersome. *FTSOC*'s simplified mouse control feels unnatural. Using a flight stick controller helps by adding discrete aileron, rudder and elevator controls.

During my time with *FTSOC*, the difficulty levels received several adjustments, but some missions were too challenging even at easy settings. The final release may see better balance and controls. The game also includes a free-flight mode, individual challenge missions and multiplayer play over the Internet.

FTSOC didn't enamor me much as an arcade game, but its commitment to history inspired me enough to want to play through the missions.

Bernard Dy

Officially Licensed
WINCHESTER

Ultra High Power
Firing Replica M-11
.45 MILITARY SIDE ARM

Realistic Blowback Action

Fires .177 Cal Ammo

Range: 209 Yards

Manual Trigger Block Safety

Vented Combat Trigger

Quick Eject Magazine Release

Blazing Firepower... True Rapid Fire Semi-Auto Action! Blast Off 16 Shots in Seconds!

One 16 Shot Magazine Included

Textured Combat Grips

An American Legend!

Muzzle Velocity: 410 Feet Second

Individual Serial # Collector's Edition

Experience the thrill of holding an American Legend in your hands. Here's an exacting replica of the Government Issued .45 carried by generations of GI's. This Replica is manufactured by WINCHESTER , one of the original contractors and LICENSED AS AN OFFICIAL COLLECTOR'S EDITION. Each sidearm has its own etched serial number. Marvel at the tight fit and finish. All SOLID STEEL CONSTRUCTION, manufactured to the highest tolerances. At 1.87 Lbs it has the weighty heft of the old .45. REALISTIC BLOW BACK ACTION. Fully functioning hammer and slide action – just like the original! Feel the firepower as it rips off .177 Steel BB's as fast as you can press the trigger. With a muzzle Velocity of 410 FEET PER SECOND it has the stopping power to bag small game or chase off large game and pests. SPRING LOADED, HI-SPEED MAGAZINE holds 16 shots. Quick release Magazine ejects at a touch ...pop in another and you're ready with 16 more shots. One 16 Shot Magazine Included – extra clips available for even more rapid fire fun! Whatever your shooting pleasure – target, hunting or trail shooting– here's the piece that will take you to a whole new level. A sure standout in any collection! Powered by economical 12 Gram CO2 cartridges. And the SOLID SEAL TECHNOLOGY used in manufacture and assembly assures you years and years of consistent power – from first shot to last. LIFETIME FACTORY SERVICE guarantees a shooting friend for life!

Our E-Mail: mailamerica@msn.com

Full Function Hammer - Slide & Release

Check These Quality Features!

* Solid Steel Construction * Semi-Auto Rapid Fire Action * Quick Eject Clip -1 Included* Range: 209 Yards * Maximum Velocity 410 Feet Per Second * Matte Non Glare Finish* Checkered, Wood-Tone Combat Grips * Manual Trigger Block Safety * Permanently Etched Serial # * Length 8.6 " * Weight 1.87 Lbs * Much More

Mail America, Dept. 143-50
POB 8436
Pelham, NY 10803-8436

Mail full payment in cash, check, money order or credit card for Risk Free, 30 day trial..Try for 30 days if not 100% satisfied—return within 30 days after receipt for refund less postage & handling.

Check Off Items Ordered

__ #2045 – Winchester Semi Auto .45 Only... $139.95
__ #2201 350 Steel BB's Hi-Velocity Zinc Coated $6.95
__ #2235 – Set of 5–12 gram CO2 Cartridges – $5.95
__ #X45SL -Quick Release 16 Shot Magazine- $14.95
__ #2237 -Black Attache Pistol Case -Double zippered all weather treated Black Canvas. Fit 2 guns. Compartments for all accessories. Plush padding. Velcro closures. -$29.95

TACTICAL HOLSTERS -Heavy Duty Shoulder Harness with holster. Double stitched soft padded canvas. Both have many velcro closures on holster for custom fit and draw. Velcro Ammo pouches for CO2, speed loader. Hip model attaches to your belt and has leg strap with adjustable length. Available in Camo or Black__

__#2292 Tactical Hip Holster Camo or Black..........$16.95
__#2288 -Military Shoulder Holster Camo or Black...$16.95

Add $12.95 for Postage & Handling

Name____________________________________
Address__________________________________
City_____________________________________
State __________ Zip ____________________
Phone: (_ _ _) _ _ _ - _ _ _ _
Sign here - you are 18 yrs or older:____________________
Send E-mail for Shipping & Tracking info:

Visa Mastercard Discover mail in Credit Card InfoMail In
Acct #: _ _ _ _ - _ _ _ _ - _ _ _ _ - _ _ _ _
Expiration Date: Month _____ Year______ Sec Code_____

Visa - MasterCard - Discover Credit or Debit Cards
For Phone Orders or Info Call: (914) 738 –7282 ☎

AVIATION HISTORY MARKETPLACE

“To you, it’s the perfect lift chair. To me, it’s the best sleep chair I’ve ever had.” — J. Fitzgerald, VA

It’s a “Sleep Chair”– for a comfortable and relaxing night’s sleep

It’s a “Lift Chair”– that puts your feet safely on the floor – you’re ready to go!

It’s a “Chair”– for crafting, eating, visiting with friends and family

It’s a “Sit Back Chair”– for reading, watching TV and resting

The Perfect Sleep Chair®
Call now toll free
for our lowest price.
1-888-785-0750
Please mention code 103113.

46402

Guide To Over 900 Aircraft Museums
USA & Canada - 27th Edition

Plus City Displayed Aircraft
Restaurants with Aircraft
Alphabetic Lists of All Aircraft

Book or CD . . . . . $18.00 + S&H
Both for . . . . $27.00 + S&H
S&H in USA. $6.00
S&H Canada $20.00
S&H all other Countries. . $24.00

Michael Blaugher • 10829 S 600 W, Dept AH, Warren, IN 46792
ACCEPT: PAYPAL, CHECK, MO • Credit Card via email Only
email: airmuseums@aol.com • www.aircraftmuseums.com

AVIATION HISTORY
Contact us to put your advertisement in front of thousands of history enthusiasts!
800.649.9800 avh@russelljohns.com

VIETNAM
Last Patrol
WORLD WAR II
GUNBOATS IN HELL
IWO JIMA THE FIRST FIGHT WASN'T ON THE BEACH
ORDINARY OBJECTS MADE FOR SPYING
GERMAN PARATROOPERS' DESPERATE LAST GAMBIT
HOT TIMES WITH TRAINS, PLANES, AND TRUCKS
MILITARY HISTORY
DEFYING THE SULTAN
GREECE EMERGED FROM OTTOMAN

Subscribe Today!

HistoryNet is the world’s largest publisher of history magazines, visit
SHOP.HISTORYNET.COM
to subscribe to any of our nine titles
HISTORYNET

For information on placing a Direct Response or Marketplace ad in Print and Online contact us today:
Aviation History 800.649.9800 / Fax: 800.649.6712 / avh@russelljohns.com / www.russelljohns.com

REVIEWS

ACES OF JAGDGESCHWADER NR III

by Greg VanWyngarden, Osprey Publishing, 2016, $22.95.

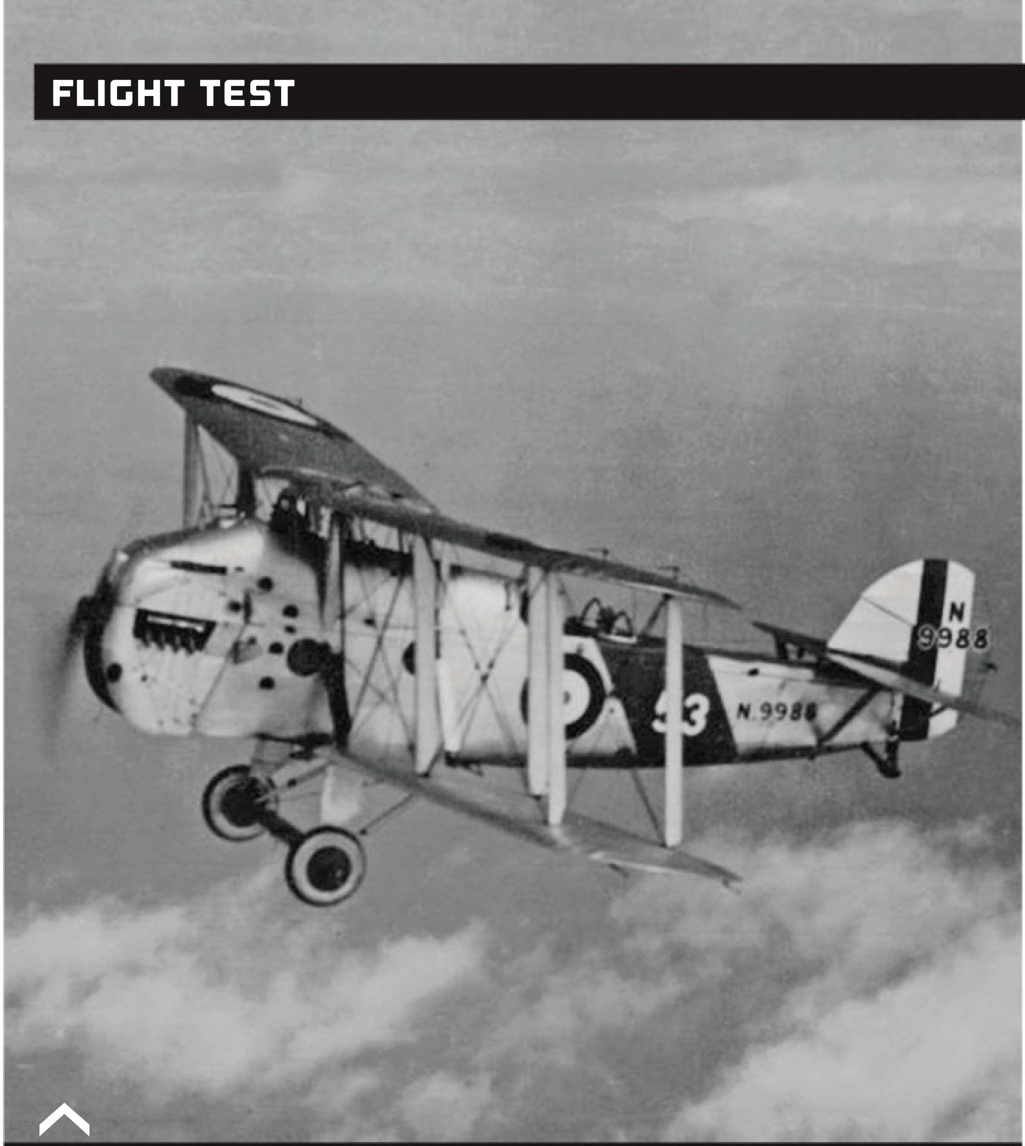
German fighter aviation expert Greg VanWyngarden had written books on *Jagdgeschwader* I (widely known as the Red Baron’s Flying Circus) and JG.II, the blue-tailed fighter wing most associated with Rudolf Berthold, when Osprey suspended its “Aviation Elite Units” series. Now—under the ongoing “Aircraft of the Aces” series—he goes on to cover the last four-*Jagdstaffel* collection to see action during World War I, with *Aces of Jagdgeschwader Nr III*.

Formed at the same time as JG.II in February 1918, JG.III saw some preliminary dogfighting before being fully unleashed over the Flanders front at the start of Operation Michael on March 21. Combining *Jastas* Boelcke, 26, 27 and 36, it was the only wing of the three to have the same commander throughout its existence: Bruno Loerzer. Covered alongside his aircraft are those flown by Loerzer’s friend and, for more than a year, the commander of *Jasta* 27, Hermann Göring.

VanWyngarden’s unit history is replete with firsthand accounts from the colorful characters who made up JG.III. Just as intriguing are the impressions that Loerzer’s “Circus” made on its documented opponents, who included Britain’s Mick Mannock and Ira “Taffy” Jones, and American aces Edward Rickenbaker, Hamilton Coolidge and George Vaughn.

All in all, VanWyngarden’s latest effort is a superb way to make a WWI enthusiast’s “Flying Circus” trilogy complete.

Jon Guttman



RAF MUSEUM, HENDON

MYSTERY SHIP

Can you identify this elephantine carrier biplane? See the answer below.

KINGS OF THE NIGHT

Match the night-fighter ace with the airplane that brought him the most success.

A. Bristol Beaufighter
B. Messerschmitt Me-110G
C. De Havilland Mosquito
D. Douglas Havoc
E. Junkers Ju-88G
F. Nakajima J1N1-Ckai
G. Hawker Hurricane Mk. IIC
H. Focke Wulf Fw-190A
I. Northrop P-61B Black Widow
J. Kawasaki Ki-45-kai

1. Gordon L. Raphael
2. Carrol C. Smith
3. Karel Kuttelwascher
4. Isamu Kashiide
5. Branse A. Burbridge
6. Heinrich zu Zayn Wittgenstein
7. John R.D. Braham
8. Heinz-Wolfgang Schnaufer
9. Shigetoshi Kudo
10. Hajo Herrmann

ANSWERS: **MYSTERY SHIP:** The Blackburn Blackburn. Learn more about it at HistoryNet.com/aviation-history. **KINGS OF THE NIGHT:** A.7, B.8, C.5, D.1, E.6, F.9, G.3, H.10, I.2, J.4 **BUILD YOUR OWN RACER:** 1.D, 2.B, 3.C, 4.A, 5.B

BUILD YOUR OWN RACER

1. What was the Bäumer B.II Sausewind's claim to fame?

A. Built by a World War I ace
B. Germany's first original production airplane since World War I
C. Won the 1925 Rundflug race around Germany
D. All the above

2. Which of Art Chester's racing planes won the 1939 National Air Races and went on to star in the Tailspin Tommy films?

A. Jeep
B. Goon
C. Swee Pea
D. Wimpy

3. The Lockheed-built Cosmic Wind Formula One racer was designed by which test pilot?

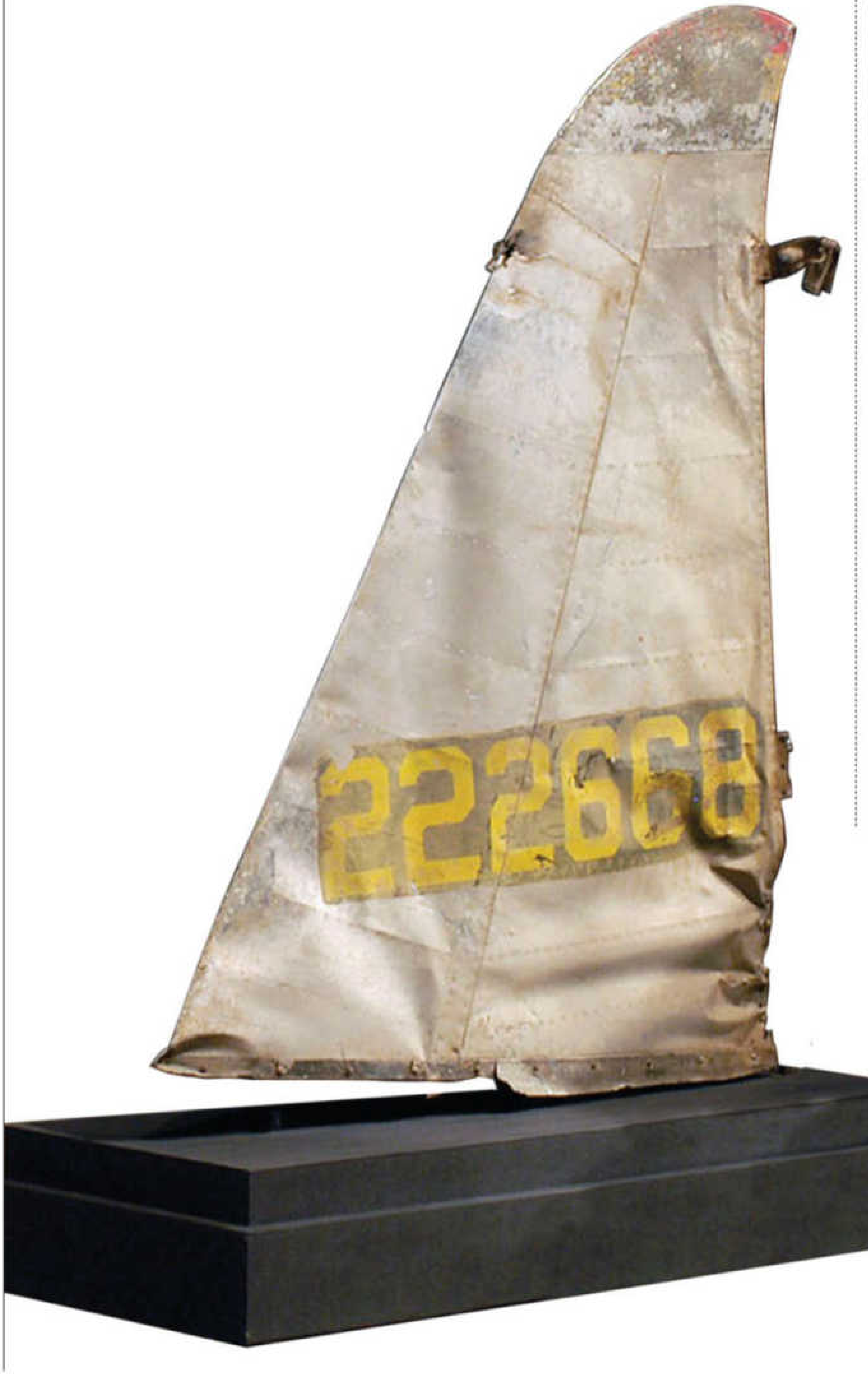
A. Chuck Yeager
B. Harry Crosby
C. Tony LeVier
D. Slick Goodlin

4. Who flew his own "Special" design to win the National Championship Midget Air Races in Fort Wayne, Ind., in 1958?

A. Tom Cassutt
B. Steve Wittman
C. Jimmy Miller
D. Ben Howard

5. Which Formula One racer has the National Air and Space Museum declared "the most successful aircraft in air racing history"?

A. Laird Super Solution
B. Sharp DR 90 Nemesis
C. Miller Little Gem
D. Howard DGA-3



FAMOUS FIN

The vertical stabilizer of the P-47D *Fiery Ginger IV*, flown by Colonel Neel E. Kearby (above) during his final mission on March 5, 1944, was recovered from the New Guinea jungle 57 years after he was shot down by a Ki-43 "Oscar" (story, P. 28). Today the fin is on display at the National Museum of the U.S. Air Force alongside a P-47D painted in Kearby's colors (photo, P. 35). It still retains traces of the red, yellow and blue stripes representing the 348th Fighter Group's three squadrons, though the white recognition paint that originally covered the remainder of the tail has mostly disappeared.

LEFT: NATIONAL MUSEUM OF THE U.S. AIR FORCE; RIGHT: NATIONAL ARCHIVES

A DATE WHICH WILL LIVE IN INFAMY...

PEARL HARBOR

75th Anniversary

EXCLUSIVE
FIRST-EVER
MINTING

EXCLUSIVE
.9999 SILVER
RELEASE

1 oz. Silver Coin

U.S. Money Reserve proudly announces the WORLDWIDE EXCLUSIVE release of an ultra rare silver coin that pays tribute to one of the most defining moments in world history. As the first government-issued silver coin ever minted to commemorate the 75th Anniversary of Pearl Harbor, now is your chance to forever memorialize this powerful event with pure .9999 silver.

Today's release features the coveted "first issue" minting class, designating these coins as the first ever struck in the world. We honor our wartime Allies by joining forces with one of the world's most established government mints—Australia's prestigious Perth Mint—to create this first in coin history. The iconic attack is vividly brought to life with three intricately engraved U.S. Navy ships set against a backdrop of Pacific waves and Hawaii's famous landscape, while two Imperial Japanese Zero fighter aircraft fly overhead. The coin's legal tender status is affirmed with an official portrait of Queen Elizabeth II on the front.

Don't miss your chance to own this 75th Anniversary Pearl Harbor Silver Coin. If you're looking to diversify your portfolio or acquire a safe-haven asset, this limited production solid silver coin is a must for any precious metals owner. These exclusive government-issued coins are being released on a first-come, first-served basis for the special price of only $29.99 per coin. Please be advised: U.S. Money Reserve's vault inventory will be available at this limited-time price while supplies last or for up to 30 days. Do not delay. Call 1-855-425-3434 today.

OFFICIAL LEGAL TENDER, GOVERNMENT-ISSUED SILVER

Minted at the world-renowned Perth Mint and legal tender under the authority of the government of Tuvalu.

A portion of the proceeds from every Pearl Harbor Silver Coin will go toward raising a "Lone Sailor" statue at Pearl Harbor—proposed to be constructed with metal from the USS *Arizona*!

IRA APPROVED

EXCLUSIVE FIRST-RELEASE SILVER OFFER

$29.99
Per Coin

5 COINS	$149.95
10 COINS	$299.90

MASTERCARD • VISA • AMEX • DISCOVER • CHECK • BANK WIRE • ACH

1-855-425-3434

VAULT CODE: AVH10-29

USMONEYRESERVE.COM/PEARLHARBOR

U.S. MONEY
RESERVE

AAA
RATING

©2016 U.S. Money Reserve. Distributor of U.S. government silver, silver and platinum. The markets for coins are unregulated. Prices can rise or fall and carry some risks. Past performance of the coin or the market cannot predict future performance. Coins enlarged to show detail. All calls recorded for quality assurance. Offer void where prohibited. **The company is not affiliated with the U.S. government and the U.S. Mint.** This solicitation is being conducted by U.S. Money Reserve, Inc. ("USMR"), a Delaware corporation, with its principal office at 6500 River Place Blvd., Bldg. 3, Suite 400, Austin, Texas 78730, a commercial co-venturer with U.S. Navy Memorial Foundation ("USNMF"), with its principal office at 701 Pennsylvania Avenue, N.W., Suite 123, Washington, DC 20004, (202) 737-2300. For every 75th Anniversary Pearl Harbor coin purchased, $5 will be donated by USMR to USNMF. All of the contributions raised by the solicitation will be utilized for the production and installation of the USNMF Lone Sailor Statue expected to be installed at a location to be determined in Honolulu, HI. The advertising campaign for the Pearl Harbor Coins will terminate on or about February 28, 2021. USMR and USNMF are not affiliated with the U.S. Navy or any unit of the U.S. Government. All spokespeople appearing in USMR's advertisements and all USMR representatives are compensated for their efforts. INFORMATION FILED WITH THE NEW JERSEY ATTORNEY GENERAL CONCERNING THIS CHARITABLE SOLICITATION AND THE PERCENTAGE OF CONTRIBUTIONS RECEIVED BY THE CHARITY DURING THE LAST REPORTING PERIOD THAT WERE DEDICATED TO THE CHARITABLE PURPOSE MAY BE OBTAINED FROM THE ATTORNEY GENERAL OF THE STATE OF NEW JERSEY BY CALLING 973-504-6215 AND IS AVAILABLE ON THE INTERNET AT http://www.state.nj.us/lps/ca/charfrm.htm. REGISTRATION WITH THE ATTORNEY GENERAL DOES NOT IMPLY ENDORSEMENT.

ACES HIGH
AVIATION GALLERY

TOWARDS THE HOME FIRES *by Robert Taylor*

Flying low over the snow covered village of Maldon in Essex, Major Robin Olds, in his P-51K Scat VI, leads Mustangs of the 479th Fighter Group back to their base at Wattisham, on 14 February 1945.

Prints are personally signed by Robin Olds and Pilots that flew with him. Please contact us for details.

NEW COLLECTORS ALWAYS WELCOME – WWW.ACES-HIGH.COM

Eagles on the Rampage

Home Run

Return to Duxford

TOLL FREE 800 528 0887

USA GALLERY – 815 East Ojai Avenue, Ojai, CA 93023, USA Tel: Toll Free (800) 528 0887
Open Mon – Fri 9am – 5pm Weekends by appointment – call for details enquiries@aceshigh-usa.com

UK GALLERY – Vine Tree House, Back Street, Wendover, Bucks, HP22 6EB UK Tel: 01296 625681
Open Mon - Sat 9am – 5.30pm Sun 10am – 4pm enquiries@aceshigh-uk.com

NORMANDY GALLERY – 49 rue du Général de Gaulle, 50480, Sainte-Mère-Eglise, France Tel: +33 9 66 87 49 22
Open 7 days 10am – 6pm (seasonal) enquiries@aceshigh-fr.com